

**IN THE UNITED STATES DISTRICT COURT FOR THE
DISTRICT OF DELAWARE**

TECHNOLOGY LICENSING CORPORATION,
a Florida corporation,

Plaintiff,

V.

RATIONAL COOKING SYSTEMS, INC.,
a Delaware corporation,

Defendant.

C.A. No. 06-515-JJF

**DECLARATION OF PORTER F. FLEMING, ESQ.
IN SUPPORT OF DEFENDANT RATIONAL COOKING SYSTEMS, INC.'S
ANSWERING BRIEF IN OPPOSITION TO TLC'S MOTION FOR
ENTRY OF A PROTECTIVE ORDER**

VOLUME III

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*Attorneys for Defendant
Rational Cooking Systems, Inc.*

Dated: February 21, 2007

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TECHNOLOGY LICENSING CORPORATION,	:	
	:	
Plaintiff,	:	
	:	Civil Action No. 06-515-JJF
V.	:	
	:	
RATIONAL COOKING SYSTEMS, INC.,	:	
	:	
Defendant.	:	

DECLARATION OF PORTER F. FLEMING, ESQ.
IN SUPPORT OF DEFENDANT RATIONAL COOKING SYSTEMS, INC.'S
ANSWERING BRIEF IN OPPOSITION TO TLC'S
MOTION FOR ENTRY OF A PROTECTIVE ORDER

I, Porter F. Fleming, declare pursuant to 28 U.S.C. § 1746 that:

1. I am a partner with the law firm of Frommer Lawrence & Haug LLP located at 745 Fifth Avenue, New York, New York 10151 and am counsel to Rational Cooking Systems, Inc. ("RCSI") in this action.
2. I make the following declaration in support of RCSI's Answering Brief in opposition to Technology Licensing Corporation's ("TLC") motion for entry of a protective order (D.I. 46).
3. Exhibit A is a true and correct copy of a December 20, 2006 e-mail from Gregory E. Stuhlman, Esq. to the Court.
4. Exhibit B is a true and correct copy of an Electronic Notice of the SO ORDERED Mario Ceste application for admission *pro hac vice*.
5. Exhibit C is a true and correct copy of a January 4, 2007 letter from Frederick L. Cottrell, III to Jack B. Blumenfeld

6. Exhibit D is a true and correct copy of a January 5, 2007 letter from Porter F. Fleming to Rory J. Radding.
7. Exhibit E is a true and correct copy of a January 8, 2007 letter from Rory J. Radding to Porter F. Fleming.
8. Exhibit F is a true and correct copy of U.S. Patent No. 6,869,633.
9. Exhibit G is a true and correct copy of U.S. Patent App. No. 20050251450.
10. Exhibit H is a true and correct copy of U.S. Patent App. No. 20050193898.
11. Exhibit I is a true and correct copy of U.S. Patent App. No. 20050061160.
12. Exhibit J is a true and correct copy of U.S. Patent App. No. 20040020555.
13. Exhibit K is a true and correct copy of U.S. Patent App. No. 20040011006.
14. Exhibit L is a true and correct copy of U.S. Patent App. No. 20030207009.
15. Exhibit M is a true and correct copy of U.S. Patent App. No. 20030205034.
16. Exhibit N is a true and correct copy of U.S. Patent App. No. 20030205028.
17. Exhibit O is a true and correct copy of U.S. Patent App. No. 20030205027.
18. Exhibit P is a true and correct copy of Food Automation- Service Technique's ("FAST") Responses to the First Set of Interrogatories in *Food Automation-Service Techniques, Inc. v. United Electric Controls Co.*, No. 95-12663.
19. Exhibit Q is a true and correct copy of TLC's Responses to the First Set of Interrogatories in *Technology Licensing Corp., et al v. Turbochef Tech. Inc.*, No. 05-01245.
20. Exhibit R is a true and correct copy of Mario Ceste's biography on FAST's website printed on February 21, 2007.
21. Exhibit S is a true and correct copy of MINUTES of the public oral proceedings before the Technical Board of Appeal 3.2.4 of November 7, 1997.
22. Exhibit T is a true and correct copy of the Decision of the Technical Board of Appeal 3.2.4 of November 7, 1997.
23. Exhibit U is a true and correct copy of a November 12, 1997 FAST press release.
24. Exhibit V is a true and correct copy of the Settlement Agreement in *Food Automation-Service Techniques, Inc. v. United Electric Controls Co.*, No. 95-12663.

25. Exhibit W is a true and correct copy of the "Contact Us" page of FAST's website printed February 21, 2007.

26. Exhibit X is a true and correct copy of the "Contact Us" page of Smart Cooking Kitchen's[®] website printed on February 21, 2007.


27. Exhibit Y is a true and correct copy of FAST's Initial Disclosures in *Food Automation-Service Techniques, Inc. v United Electric Controls Co.*, No. 95-12663.

28. Exhibit Z is a true and correct copy of TLC's Objections and Responses to RCSI's First Set of Interrogatories (Nos. 1-11).

29. Exhibit AA is a true and correct copy of TLC's Objections and Responses to RCSI's First Set of Requests for the Production of Documents and Things (Nos. 1-132).

I declare under penalty of perjury that the foregoing is true and correct.

Dated: February 21, 2007



Porter F. Fleming

CERTIFICATE OF SERVICE

I hereby certify that on February 21, 2007, I electronically filed the foregoing with the Clerk of Court using CM/ECF which will send notification of such filing(s) to the following and which has also been served as noted:

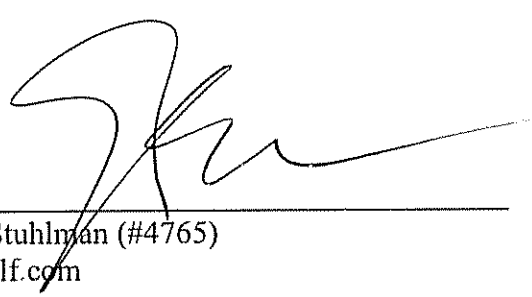
HAND DELIVERY

Jack B. Blumenfeld
Karen Jacobs Louden
Morris, Nichols, Arsht & Tunnell LLP
1201 N. Market Street
P. O. Box 1347
Wilmington, DE 19801

I further certify that on February 21, 2007, the foregoing document was sent to the following non-registered participants in the manner indicated:

FEDERAL EXPRESS

Rory J. Radding
Colette A. Reiner
Morrison & Foerster LLP
1290 Avenue of the Americas
New York, NY 10101-0050



Gregory E. Stuhlman (#4765)
Stuhlman@rlf.com

EXHIBIT N



US 20030205028A1

(19) **United States**(12) **Patent Application Publication****Sus et al.**(10) **Pub. No.: US 2003/0205028 A1**(43) **Pub. Date: Nov. 6, 2003**(54) **AUTOMATED FOOD PROCESSING SYSTEM AND METHOD**

(76) **Inventors:** Gerald A. Sus, Frankfort, IL (US); Ron Dorsten, Oak Park, IL (US); Henry T. Ewald, Roselle, IL (US); Jenny Hong, Palatine, IL (US); Glenn Schackmuth, Montgomery, IL (US); David Bone, Nashville, TN (US); Tiffany Curry, Fayetteville, TN (US); Eddie Mann, Flintville, TN (US); Mario G. Ceste, Wallingford, CT (US); Curtis Clarence Plinnow, Libertyville, IL (US); John M. Corliss, Lynn, MA (US); Joseph Gerstmann, Framingham, MA (US); James Lozouski, Marlborough, MA (US); Andrew Courier, Mansfield, MA (US); Kevin Keough, Canton, MA (US); Richard Terrazzano, Salem, NH (US); William Day, New Port Richey, FL (US); Doug Jones, New Port Richey, FL (US); Roberto Nevarez, Hudson, FL (US); Keith Stanger, New Port Richey, FL (US); Jerry Sank, Palm Harbor, FL (US); Douglas Christian Greening, Calgary (CA); John Melsner, New Richmond, WI (US); John A.J. Wedel, Stillwater, MN (US); Christopher Juneau, Hayward, CA (US); Steven Konold, Hayward, CA (US); Richard Montafi, Daly City, CA (US); Benny Nunley, Half Moon Bay, CA (US); Charles E. Rose, Hayward, CA (US); Ly Nguyen, Plano, TX (US); Mitchell Strew, Richardson, TX (US)

Correspondence Address:

RYNDAK & SURI**30 N. LaSalle Street, Suite 2630****Chicago, IL 60602 (US)**(21) **Appl No: 10/127,390**(22) **Filed: Apr. 22, 2002****Publication Classification**(51) **Int. Cl.⁷ B65B 57/00**(52) **U.S. Cl. 53/440; 53/127; 53/458; 53/564; 53/55**(57) **ABSTRACT**

An automated food processing system and method is provided that allows food to be dispensed, fried and packaged in a suitable container, which may be an individual portion-sized container. In one embodiment, the system includes separate automated modules for dispensing, frying and packaging the food.

In one embodiment, an automated dispensing device dispenses a predetermined portion of food from a bulk storage container or food dispensing magazine. Food is dispensed from the automated dispensing device to an automated fry device that can include at least one circular fry wheel having a plurality of food containing compartments. After the food is fried it is dispensed from the fry device to an automated packaging device. The automated packaging device dispenses food to a container that may be an individual portion-sized container that is retrieved, erected and held into position for filling by an automated container handling system. After a food container is filled, a conveyor system transports the filled container to a suitable pick-up location.

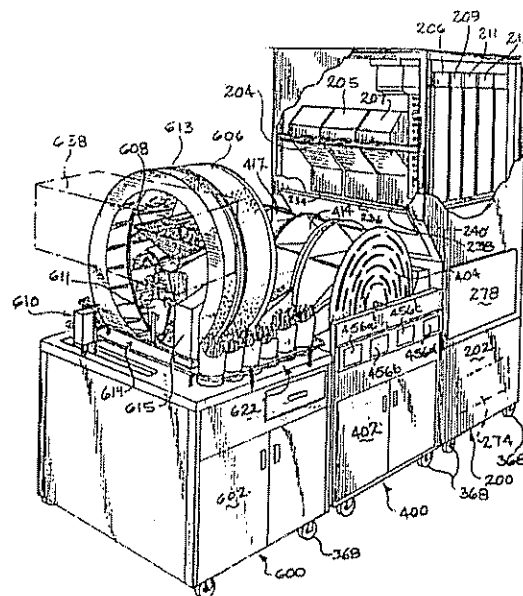


FIG. 1

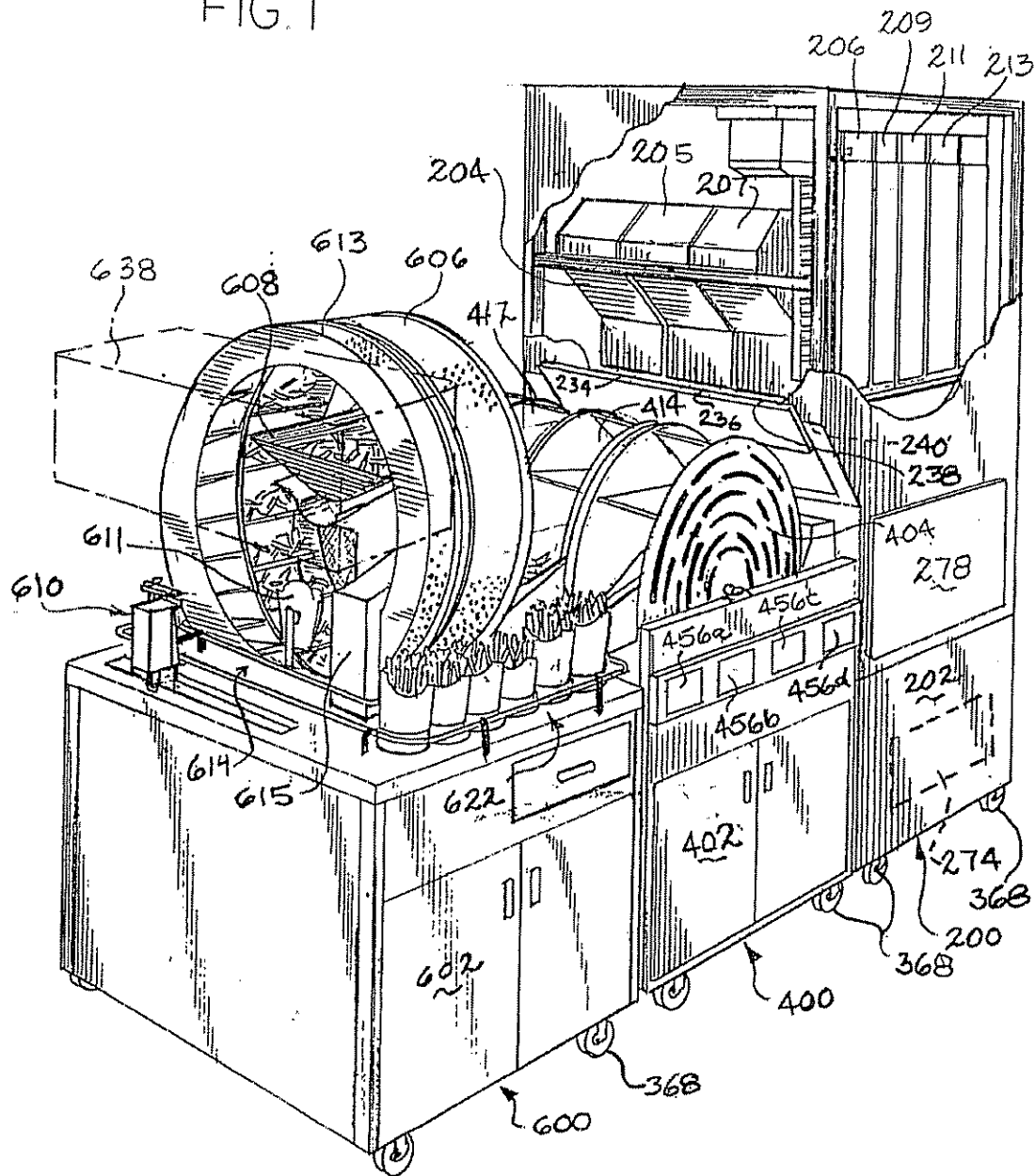
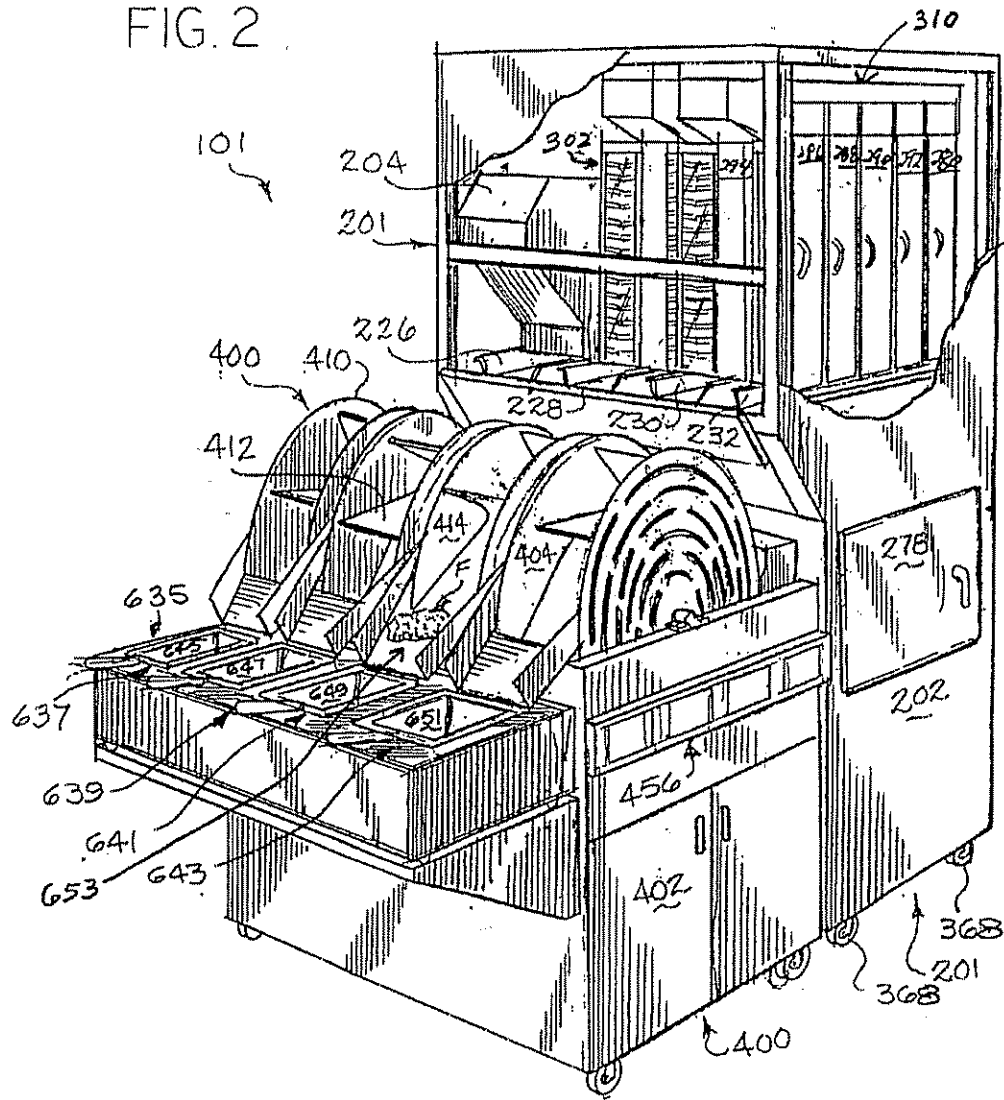


FIG. 2



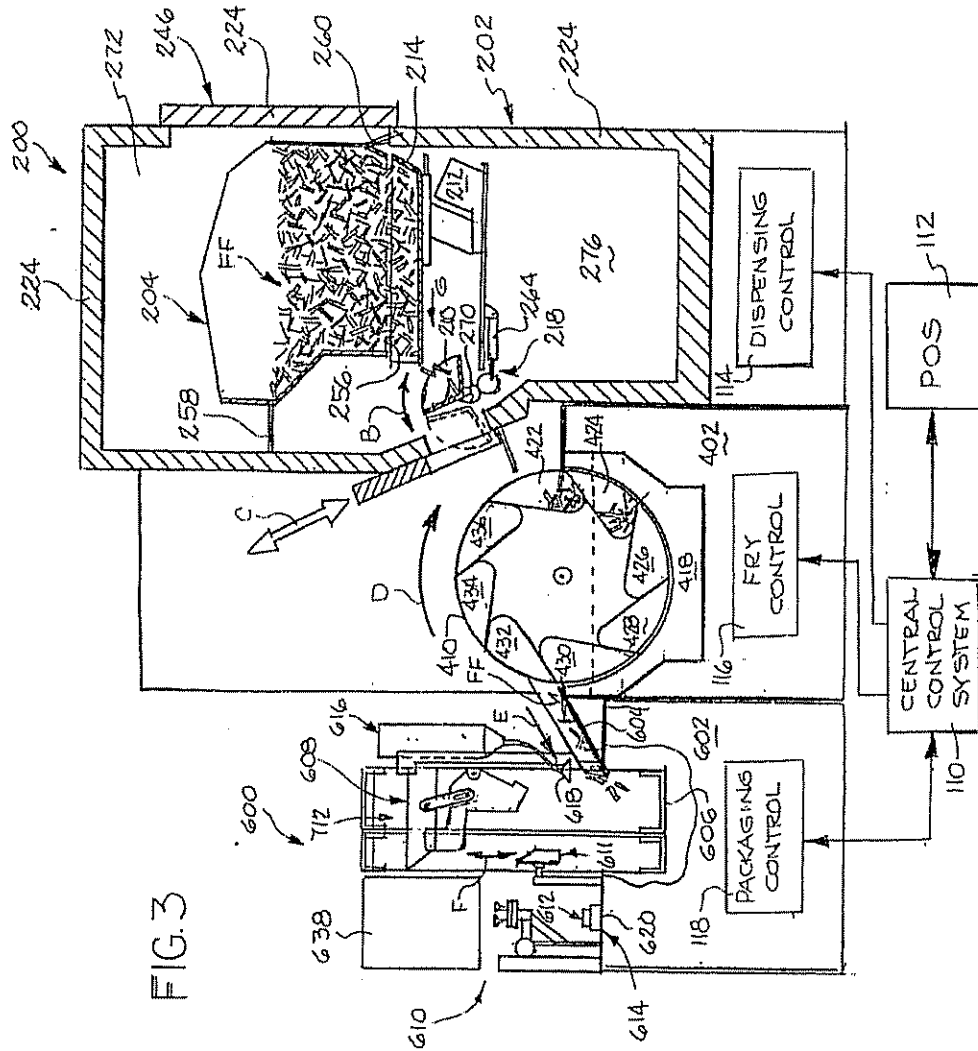


FIG. 4

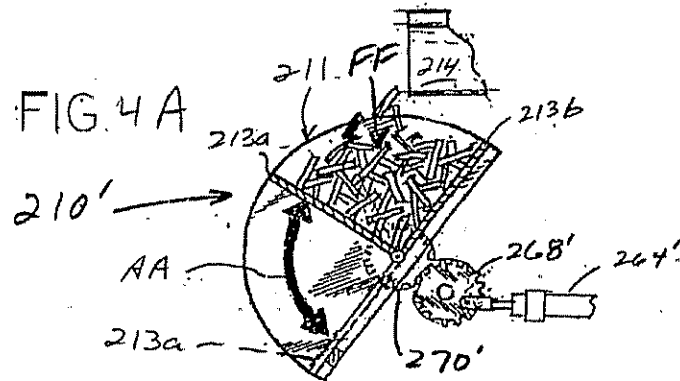
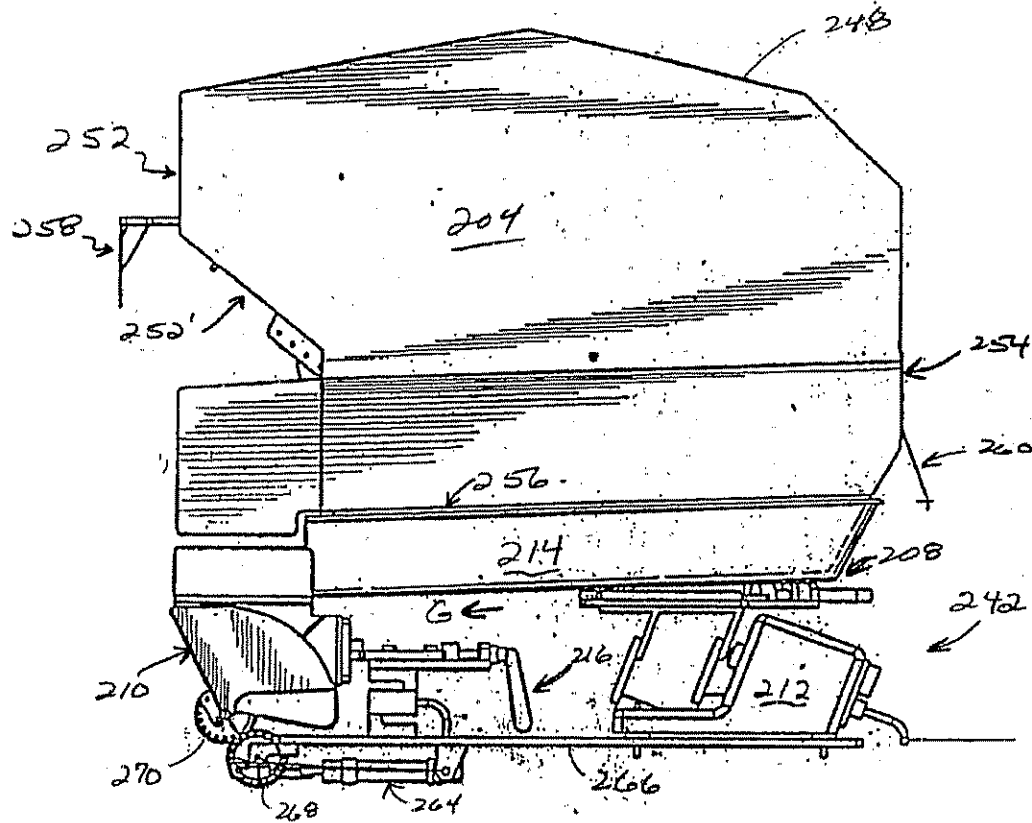
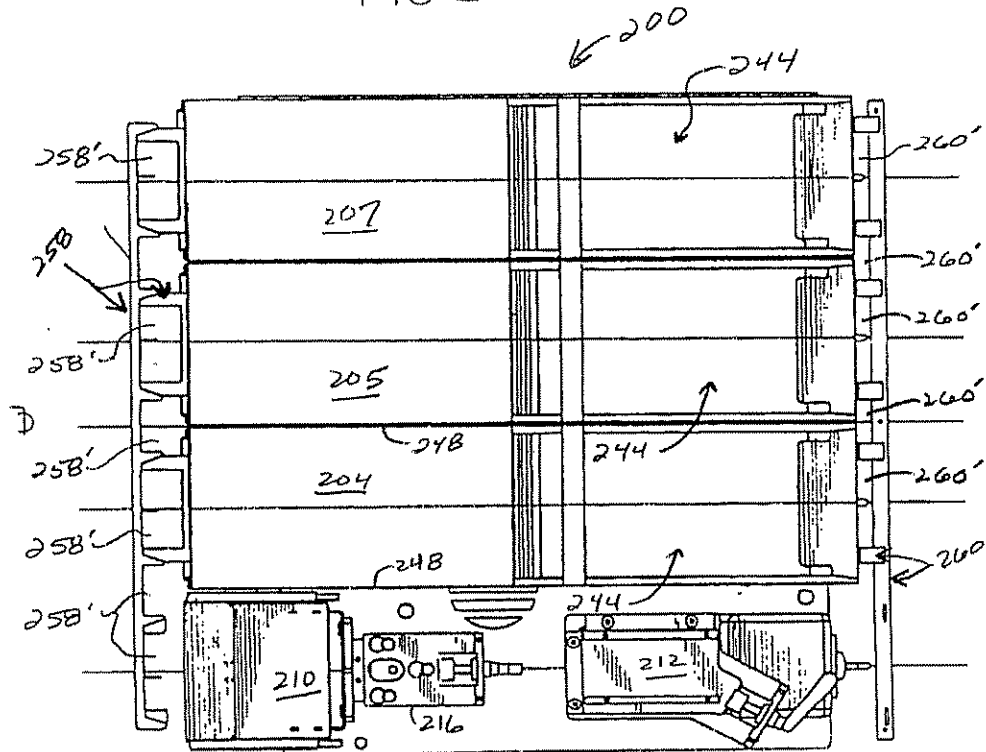
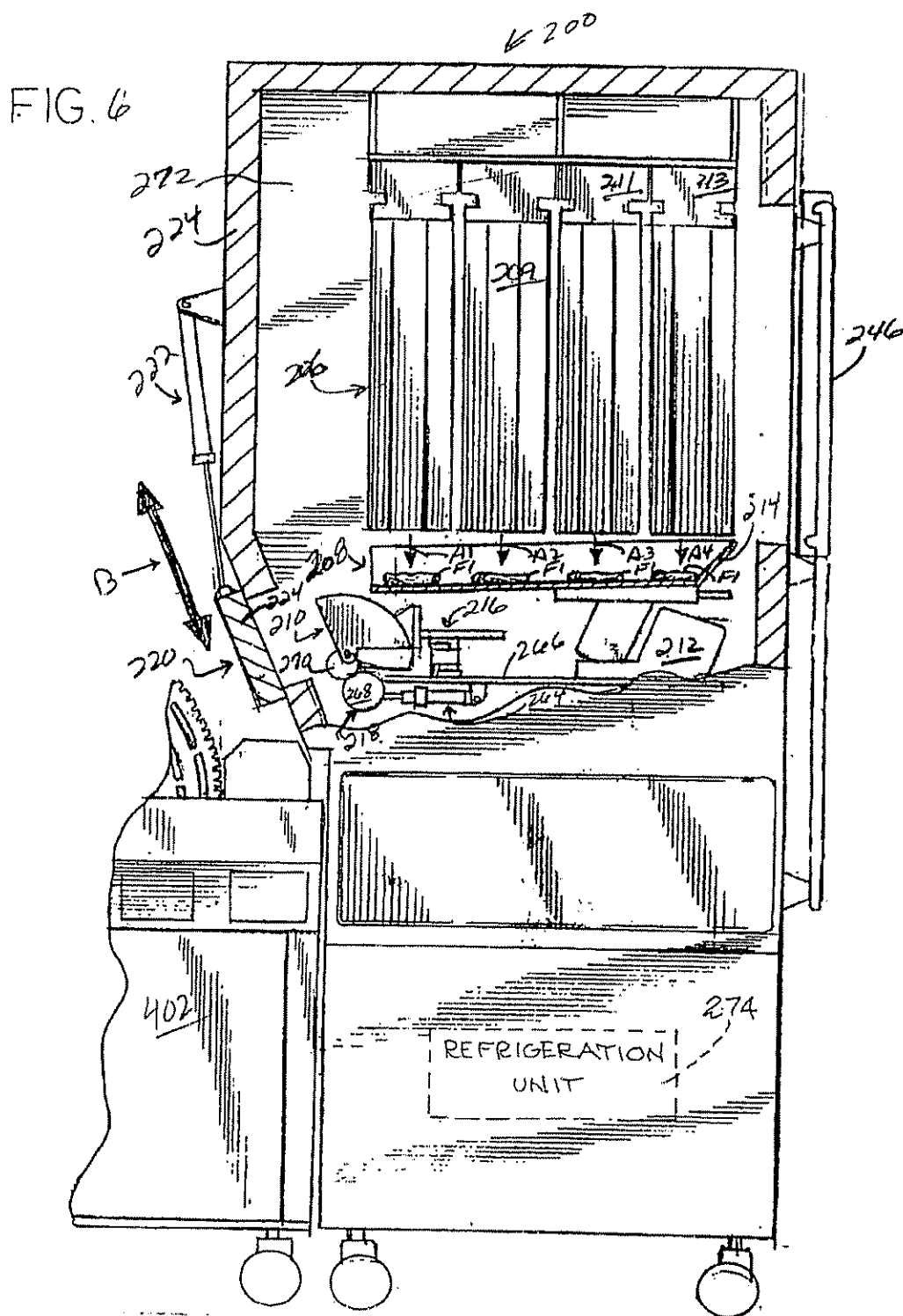
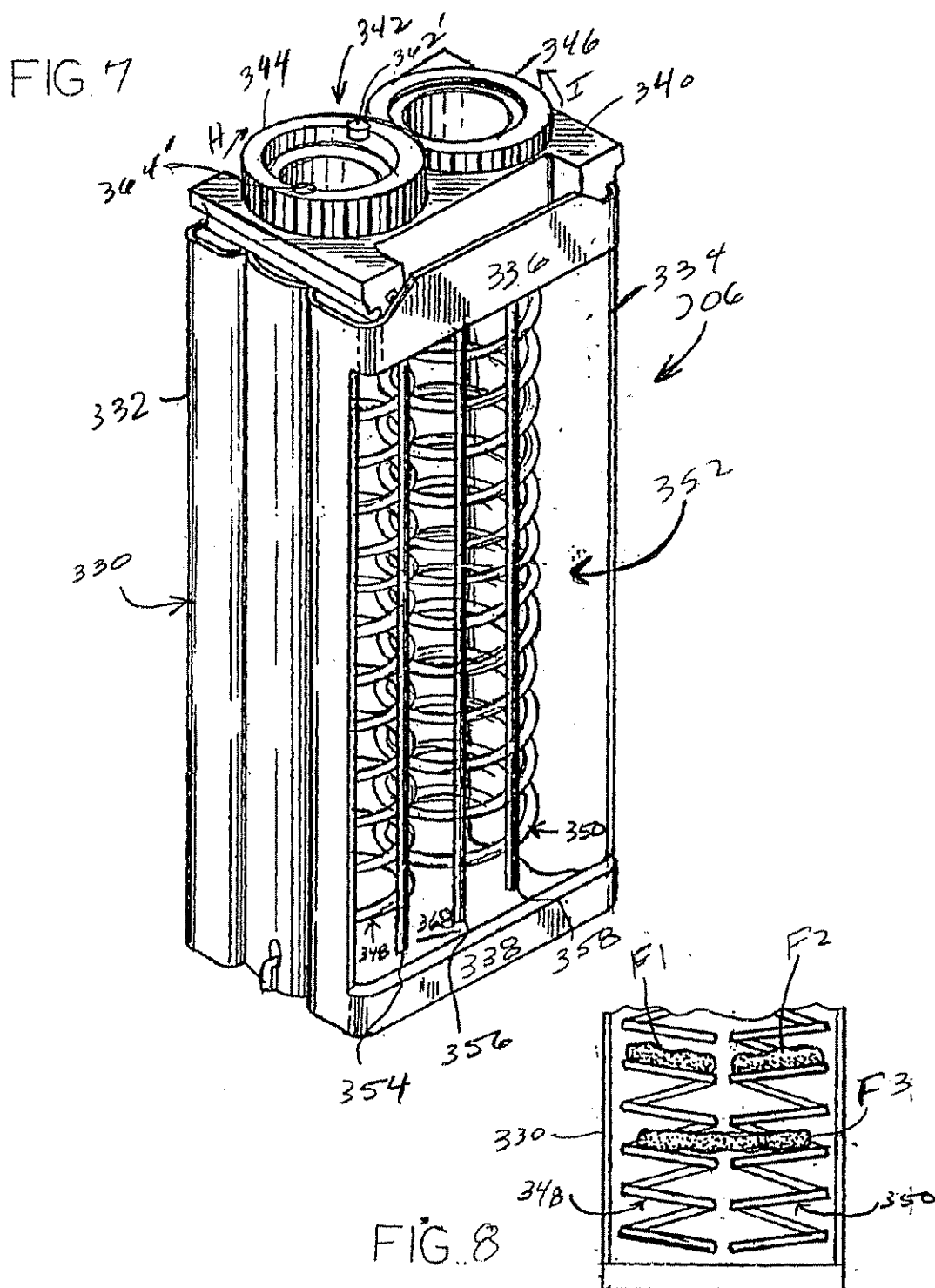


FIG 5







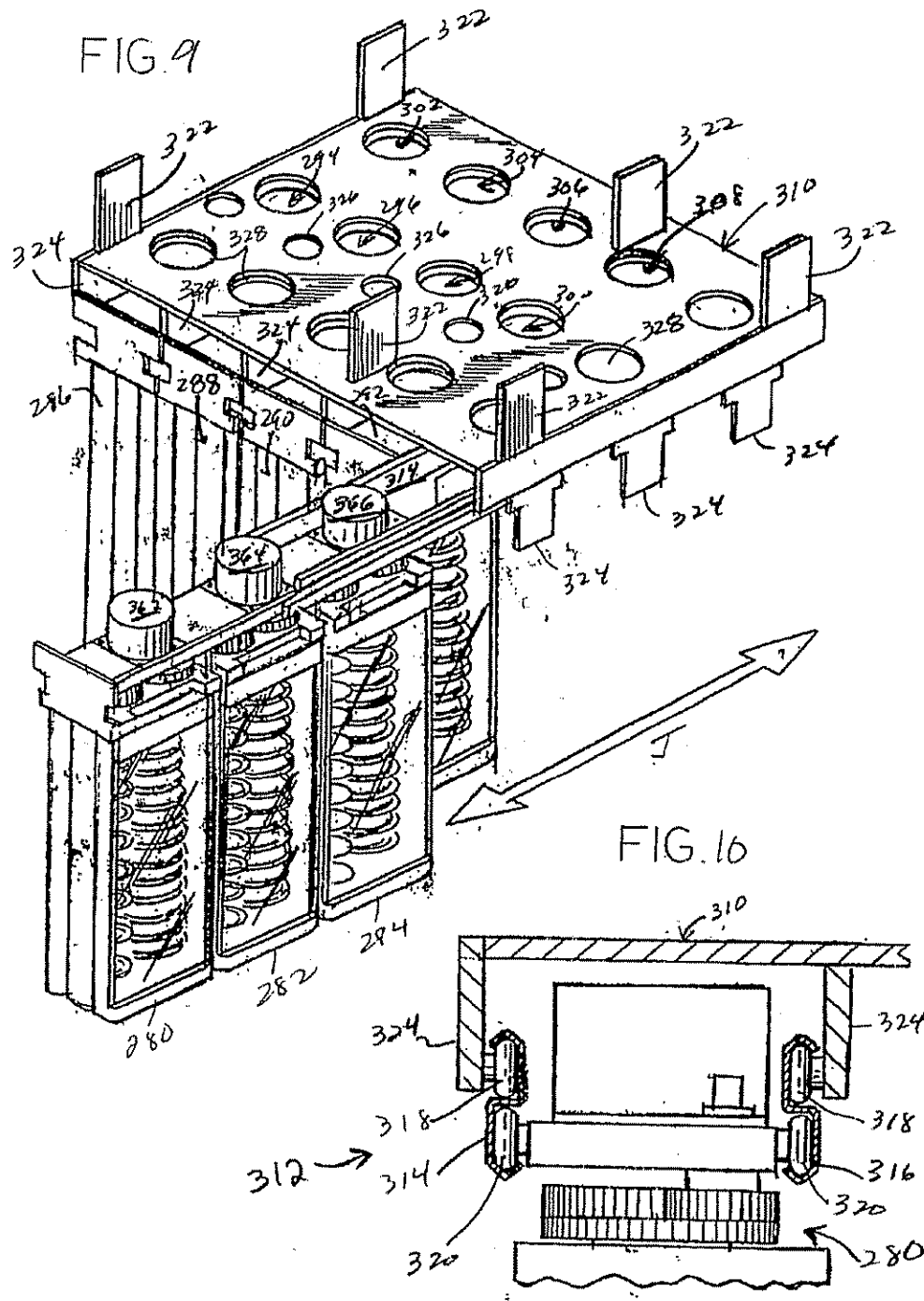


FIG. 11

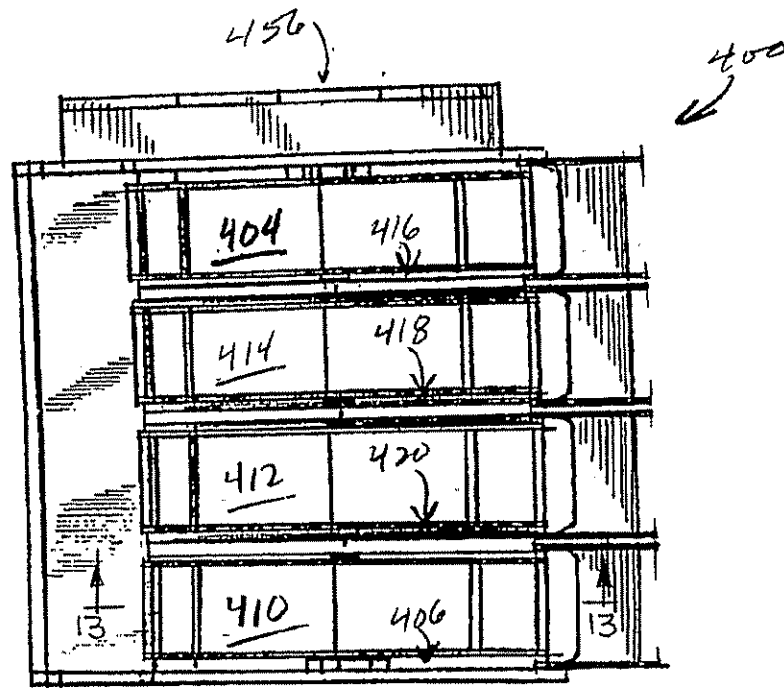
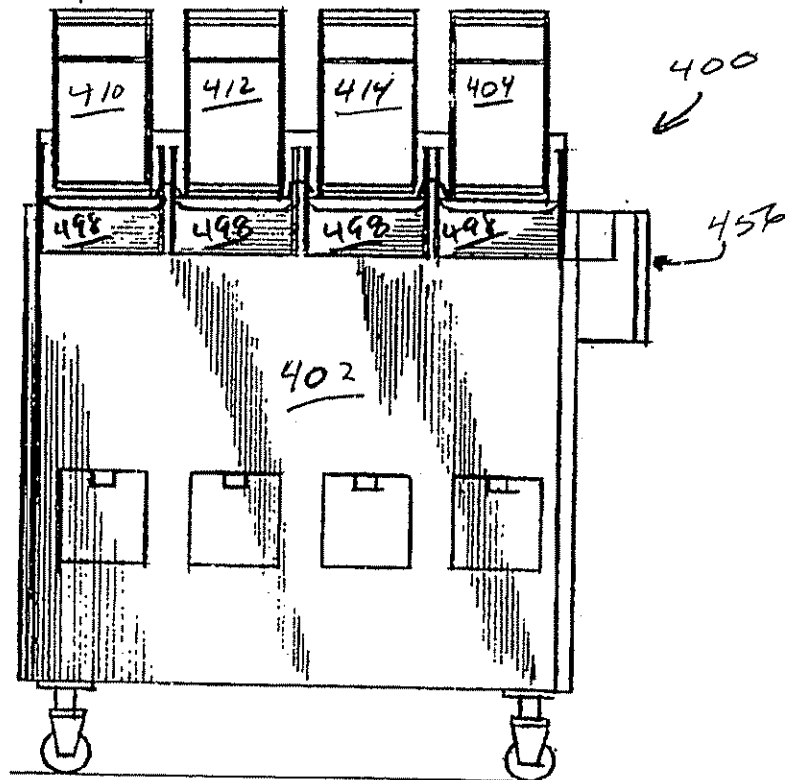
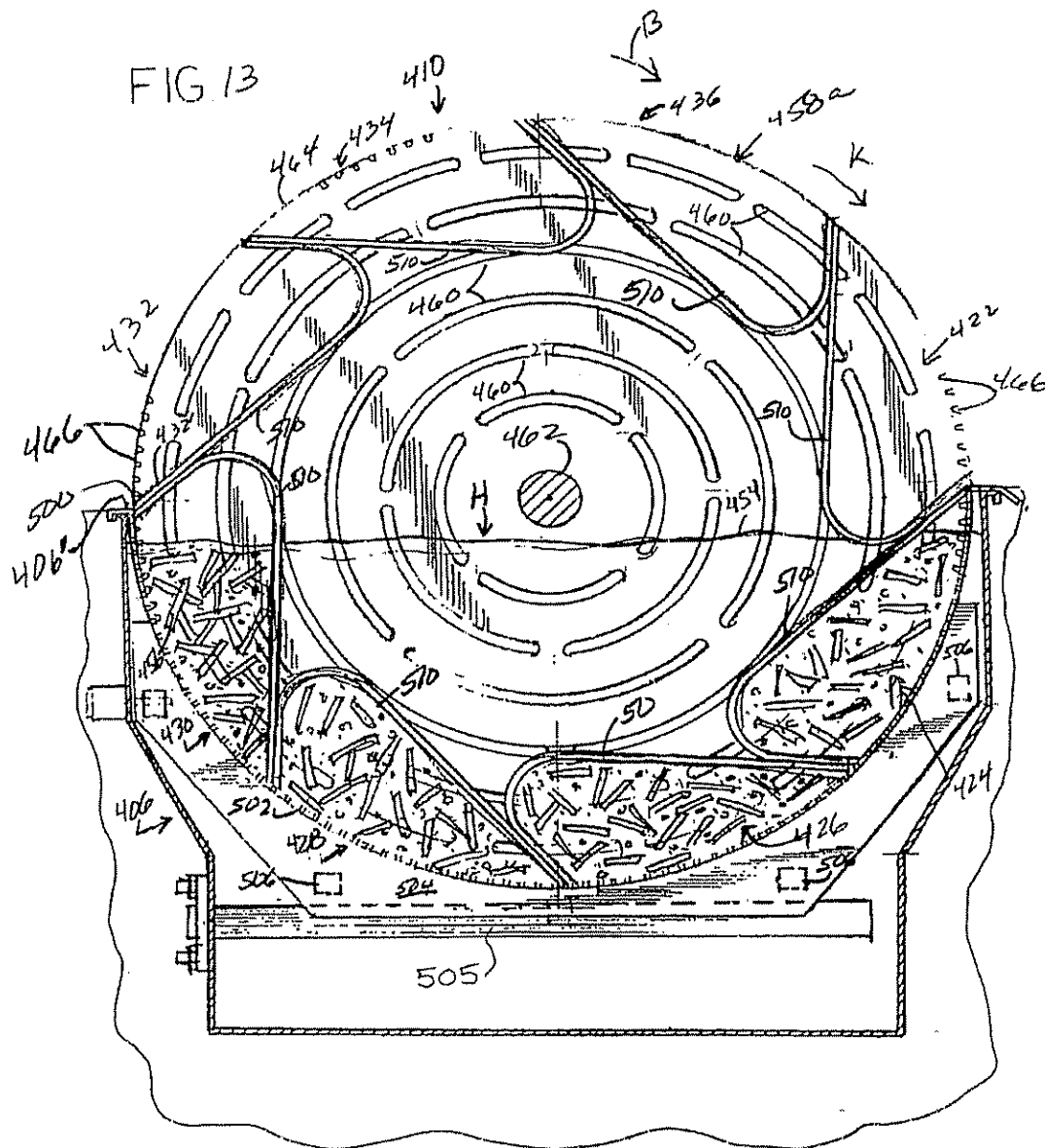


FIG. 12





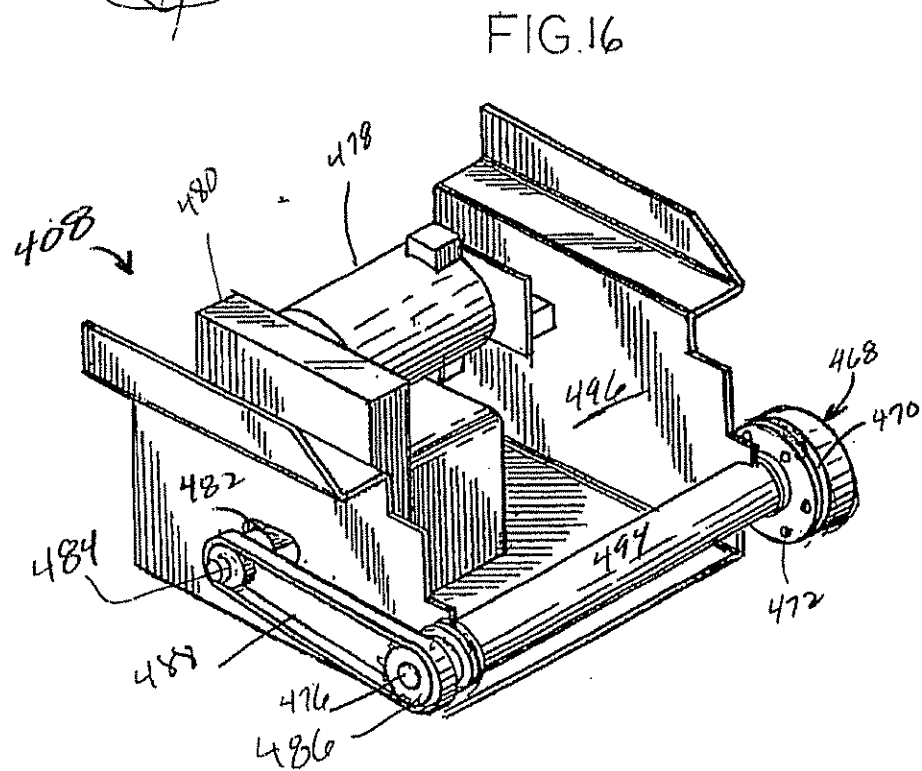
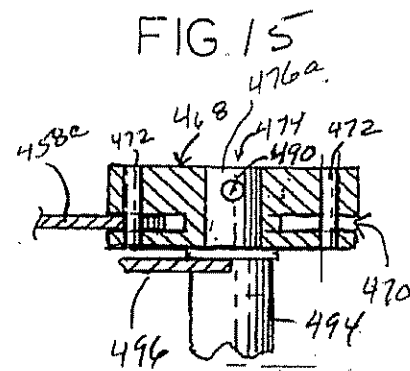
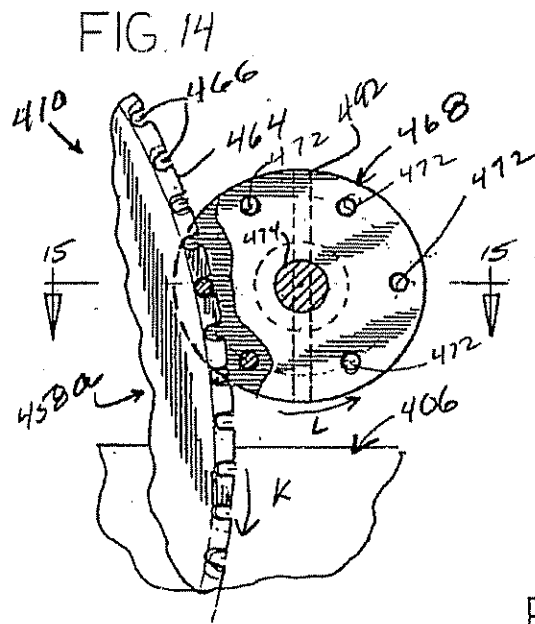


FIG. 17

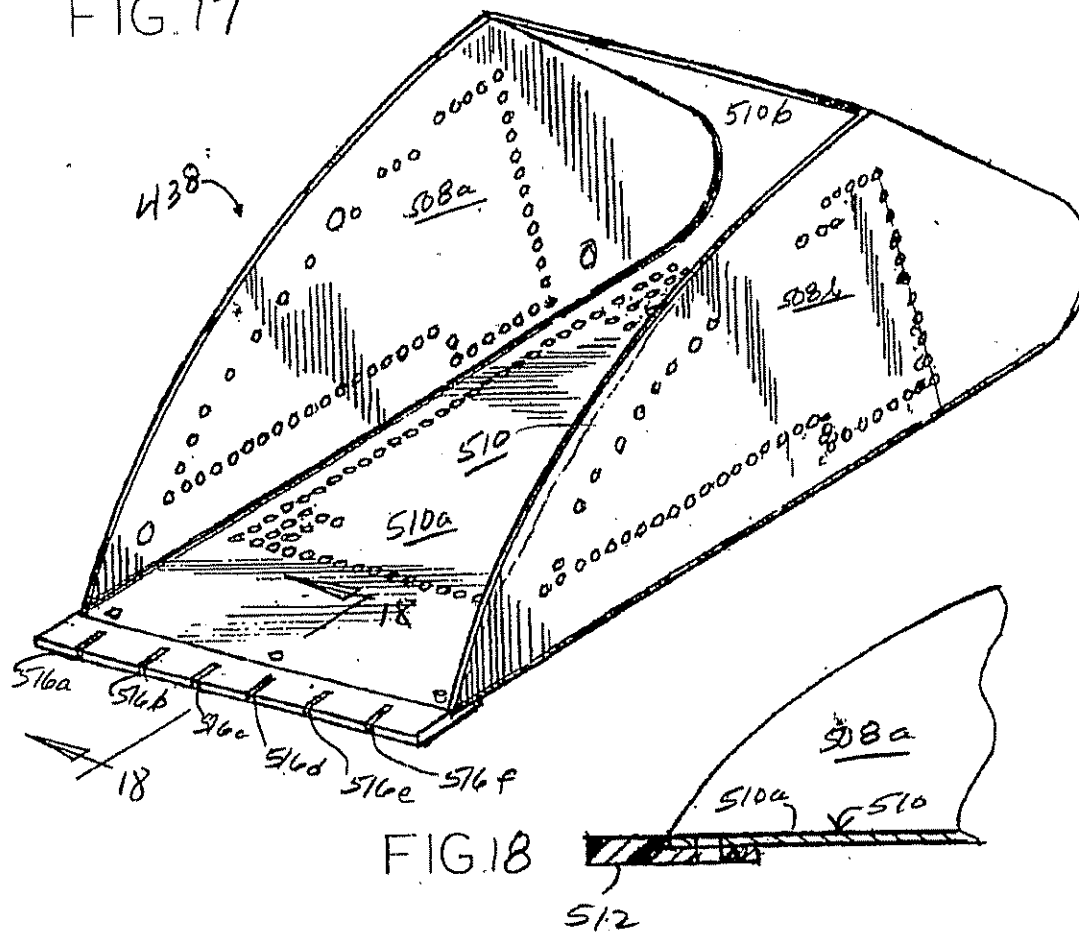
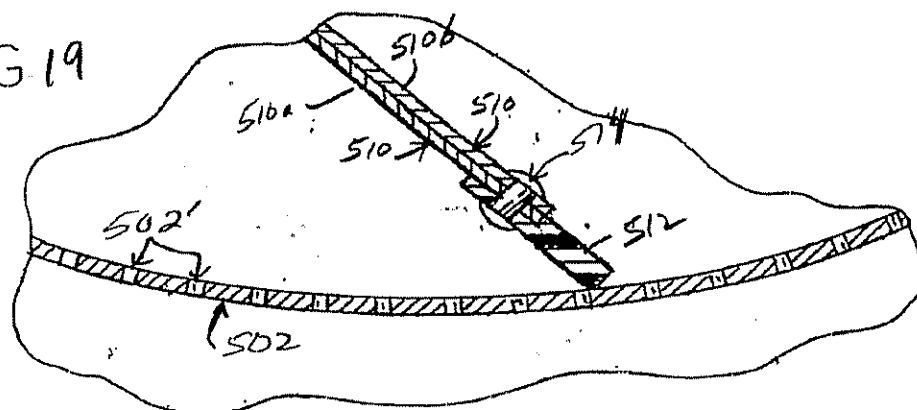
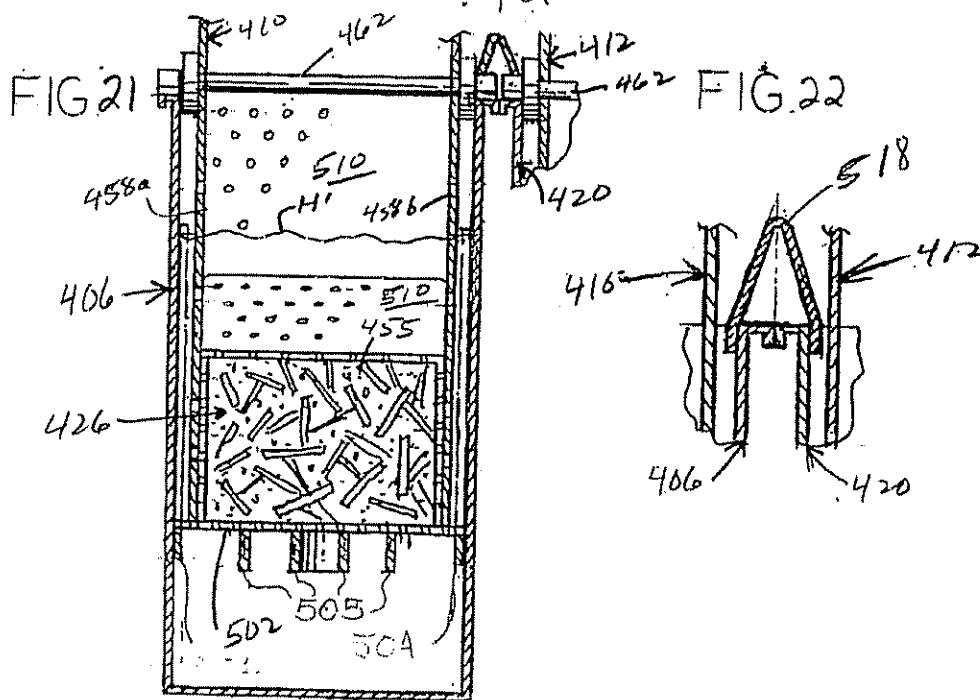
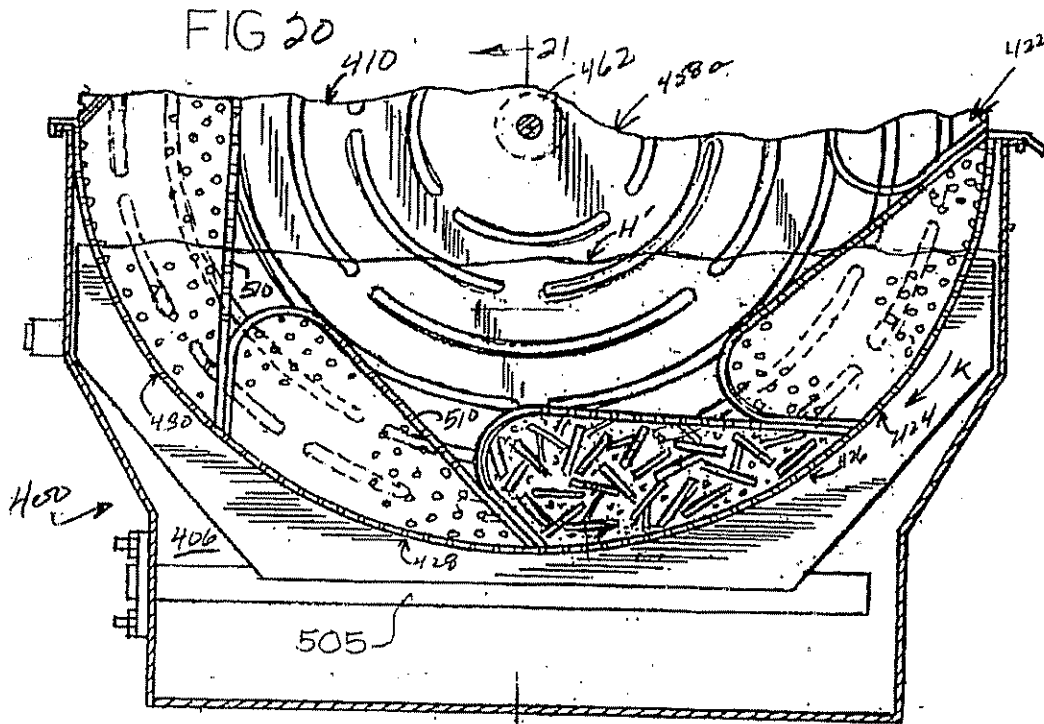
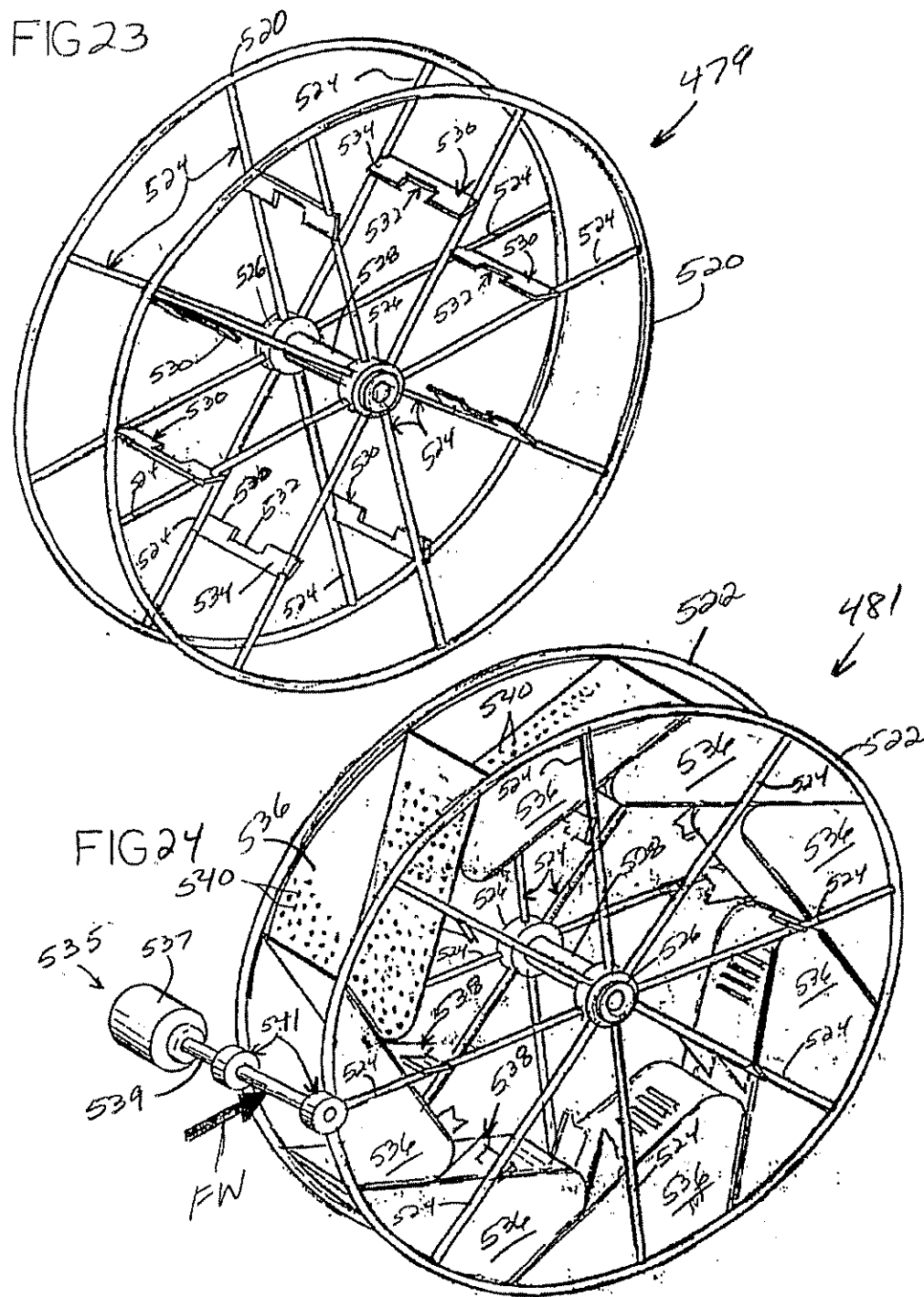
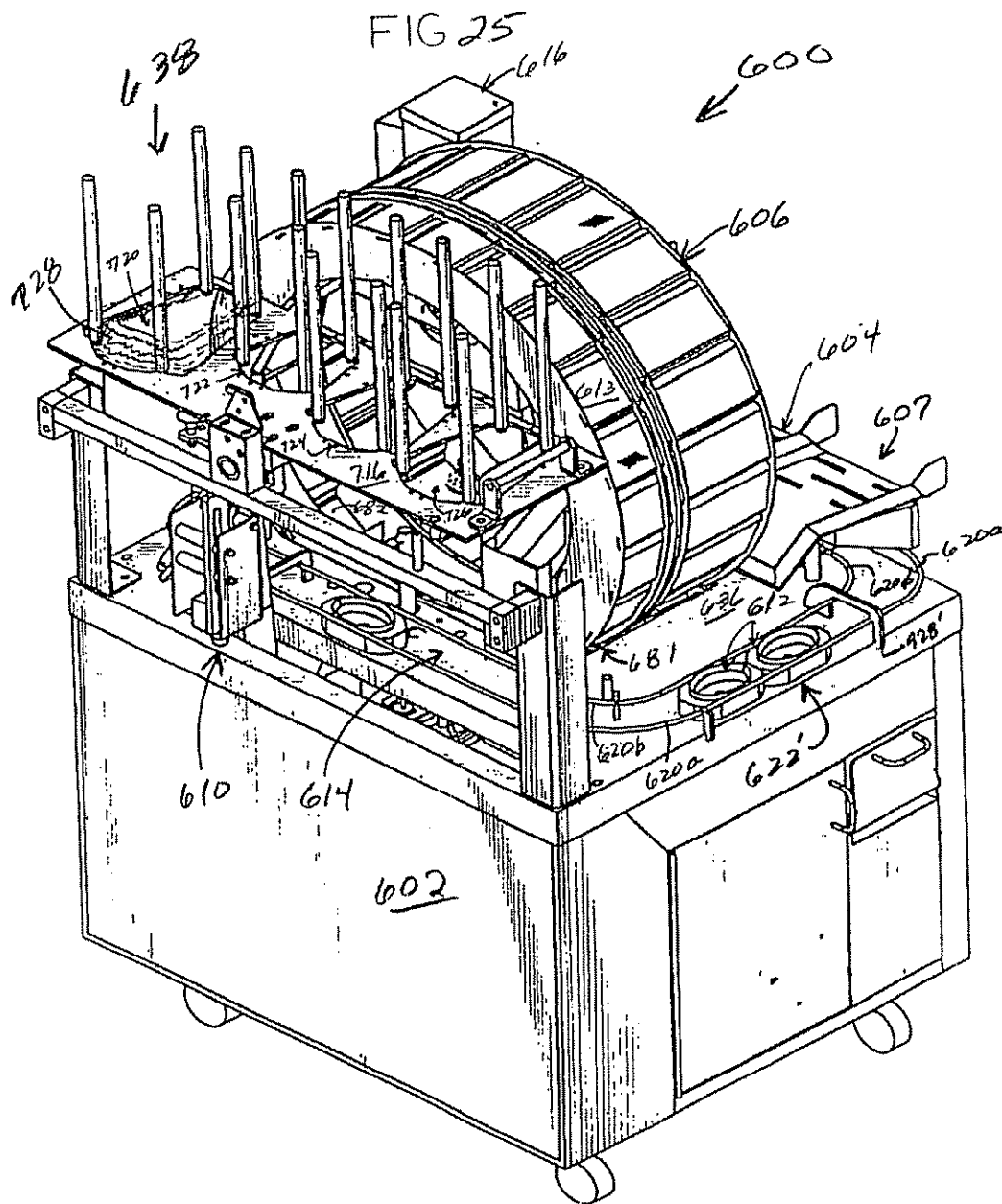


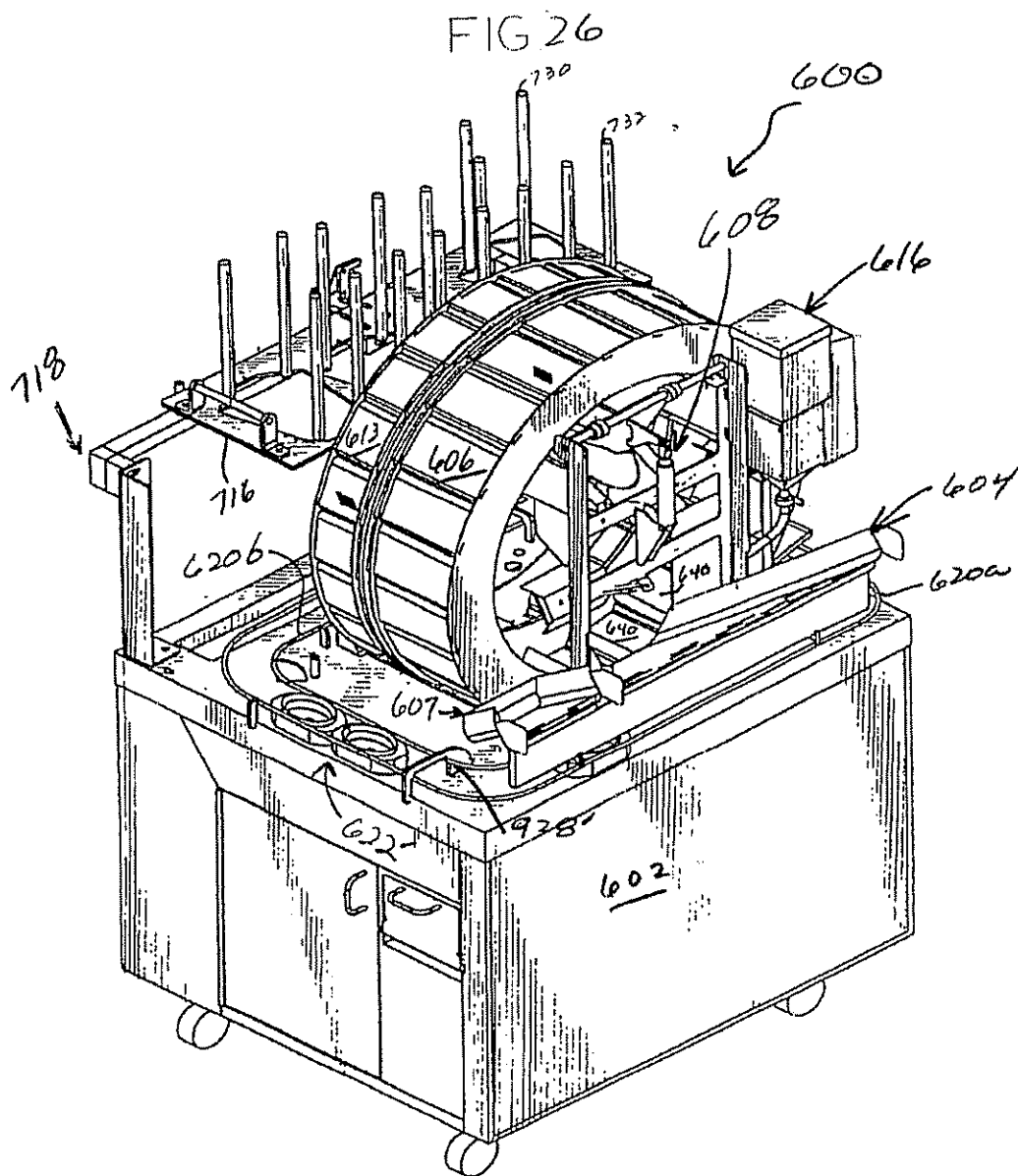
FIG. 19

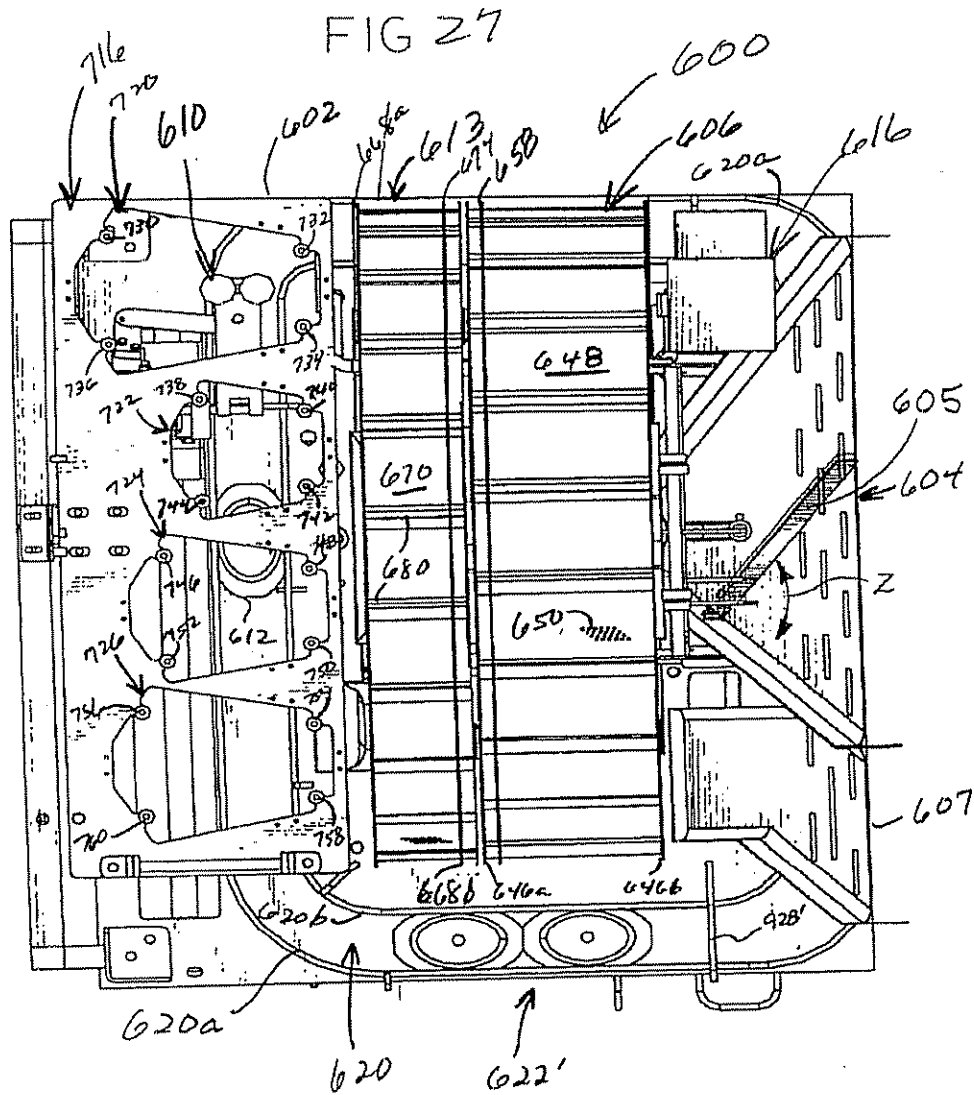


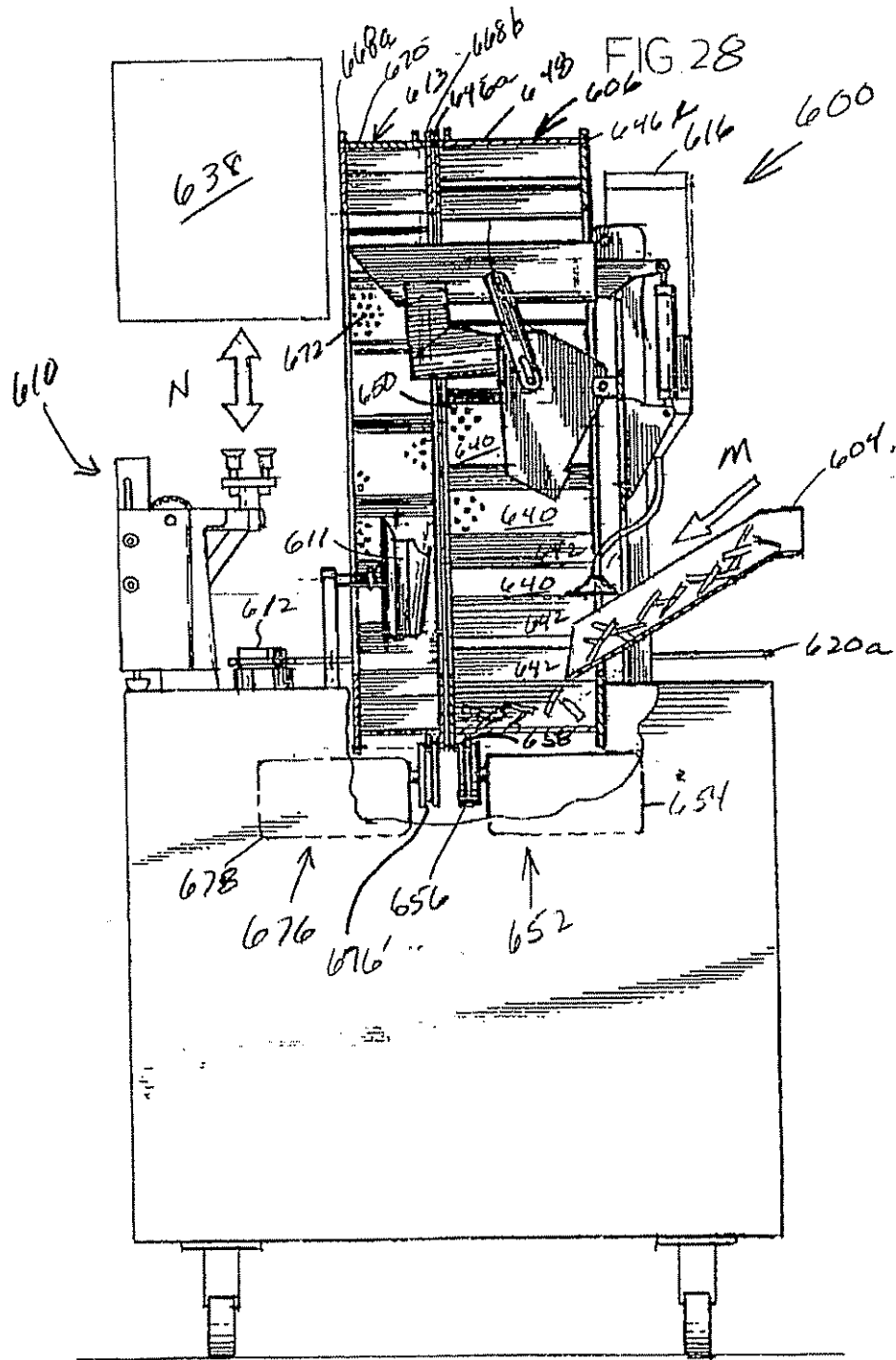


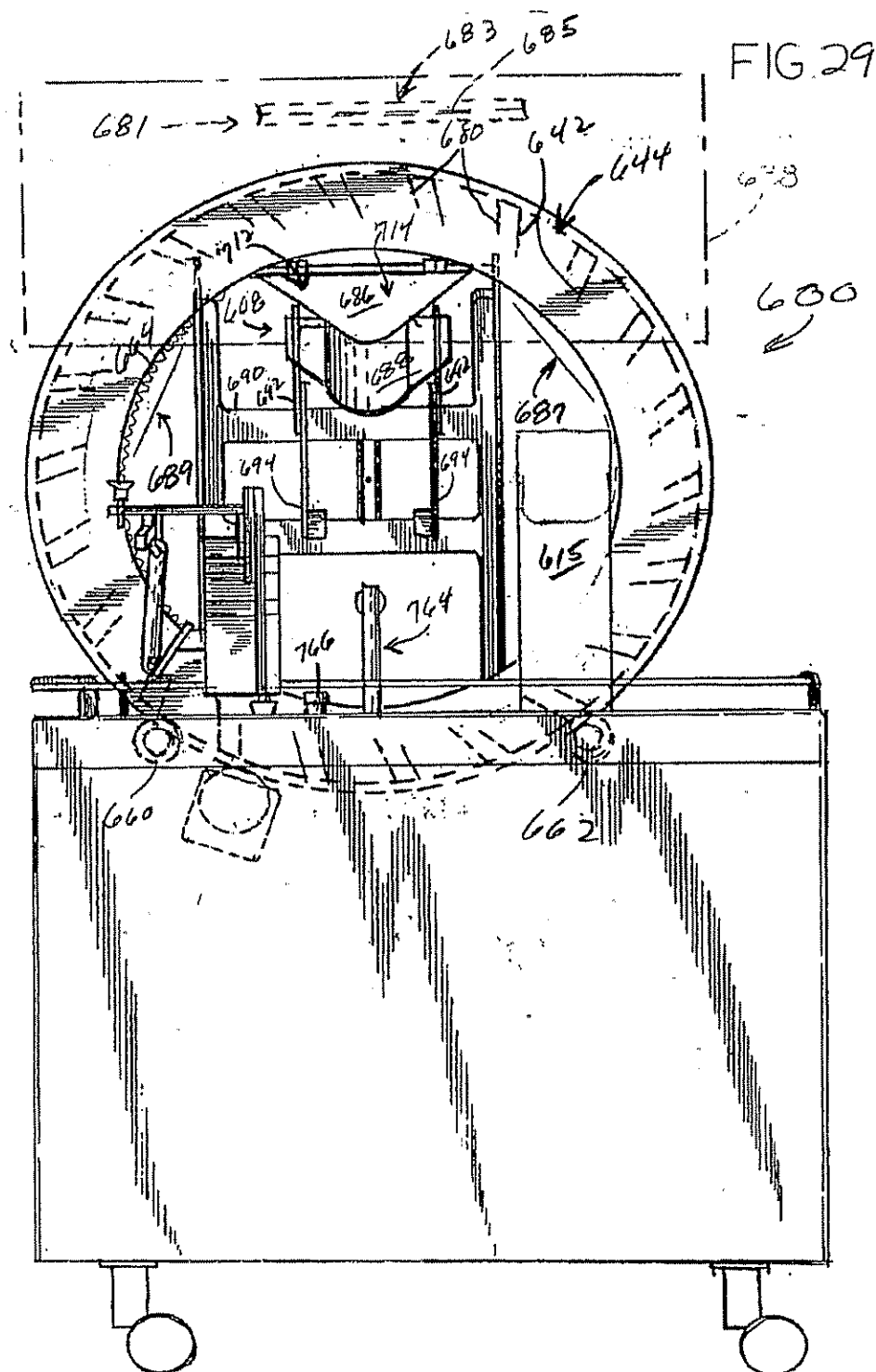












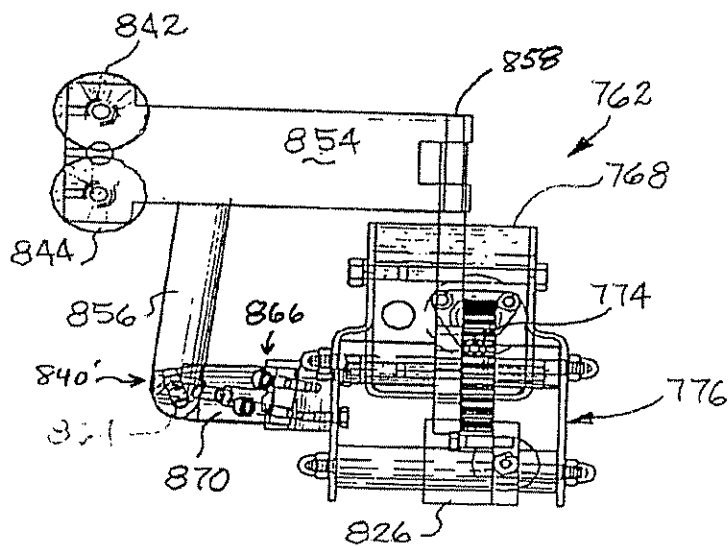
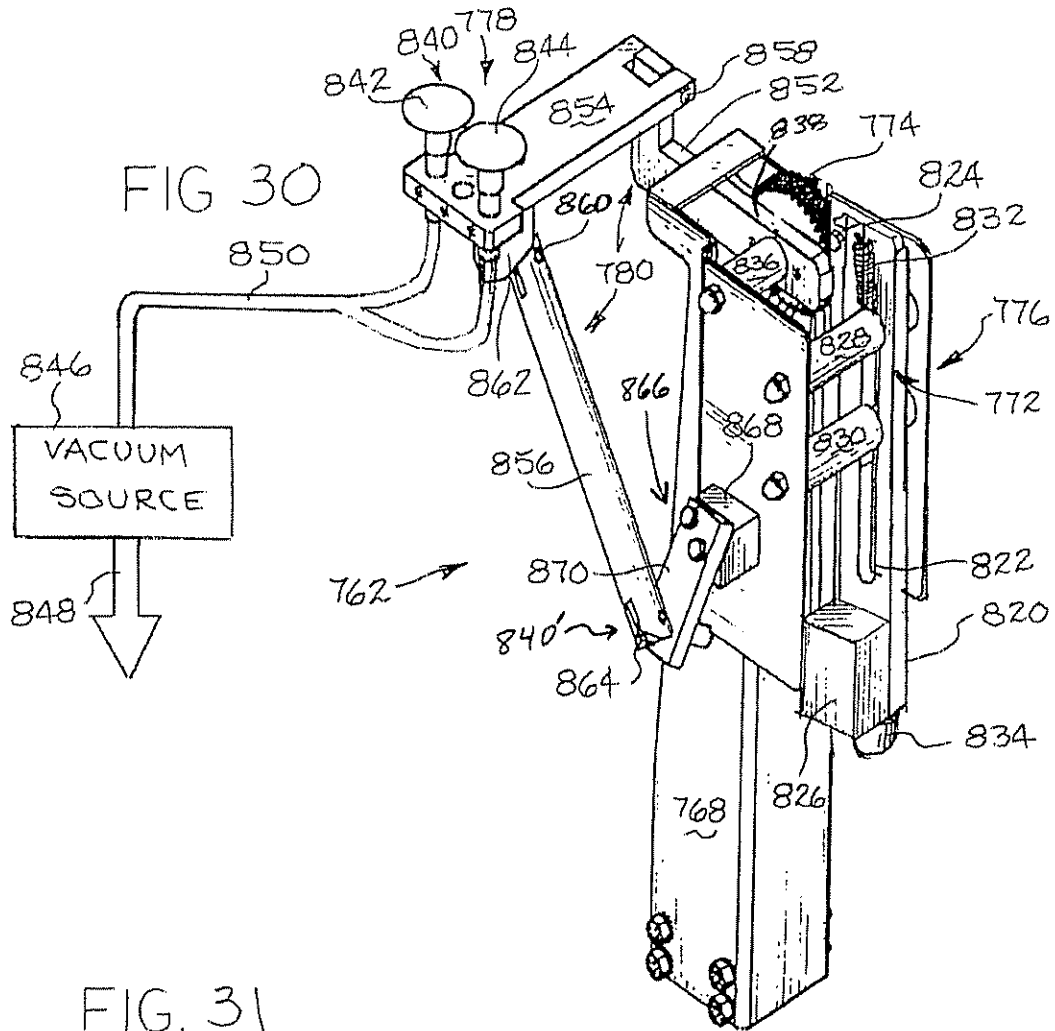


FIG 32

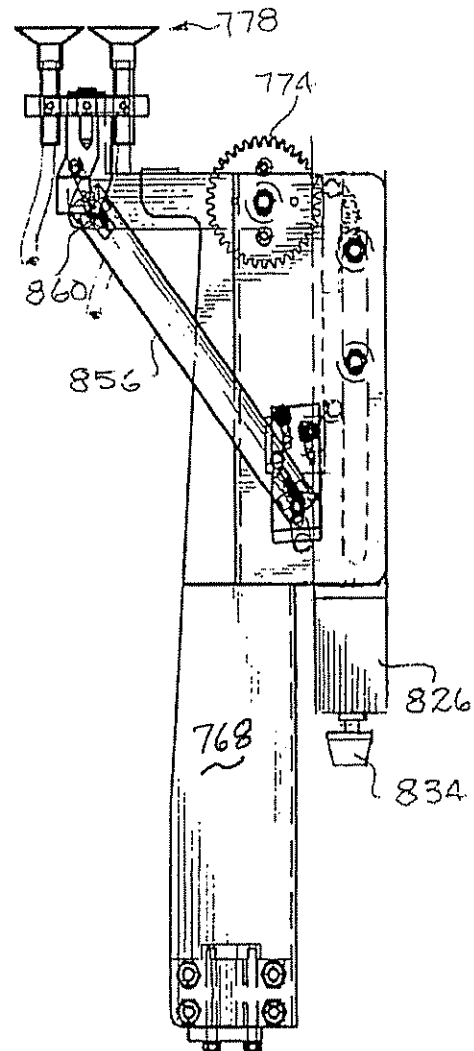
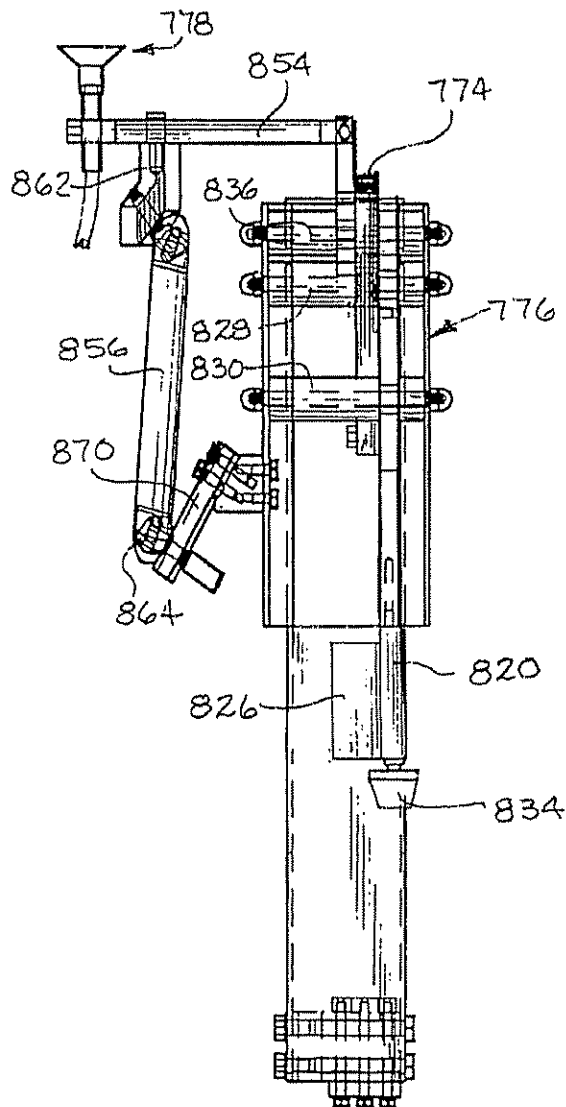
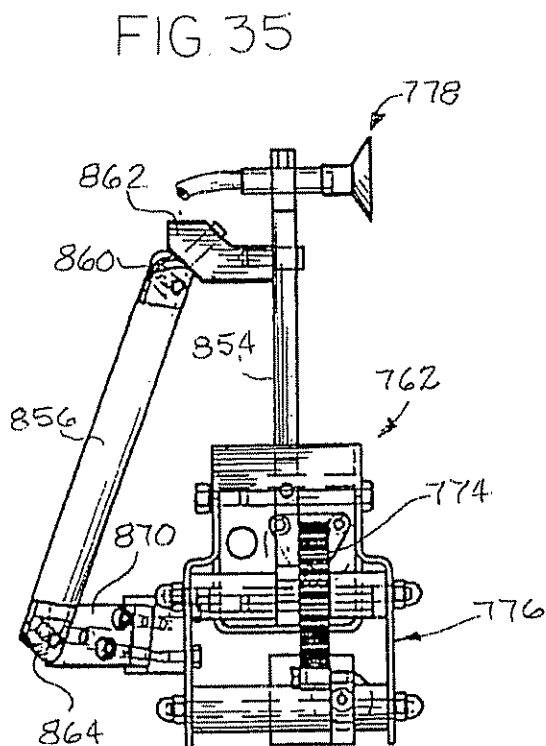
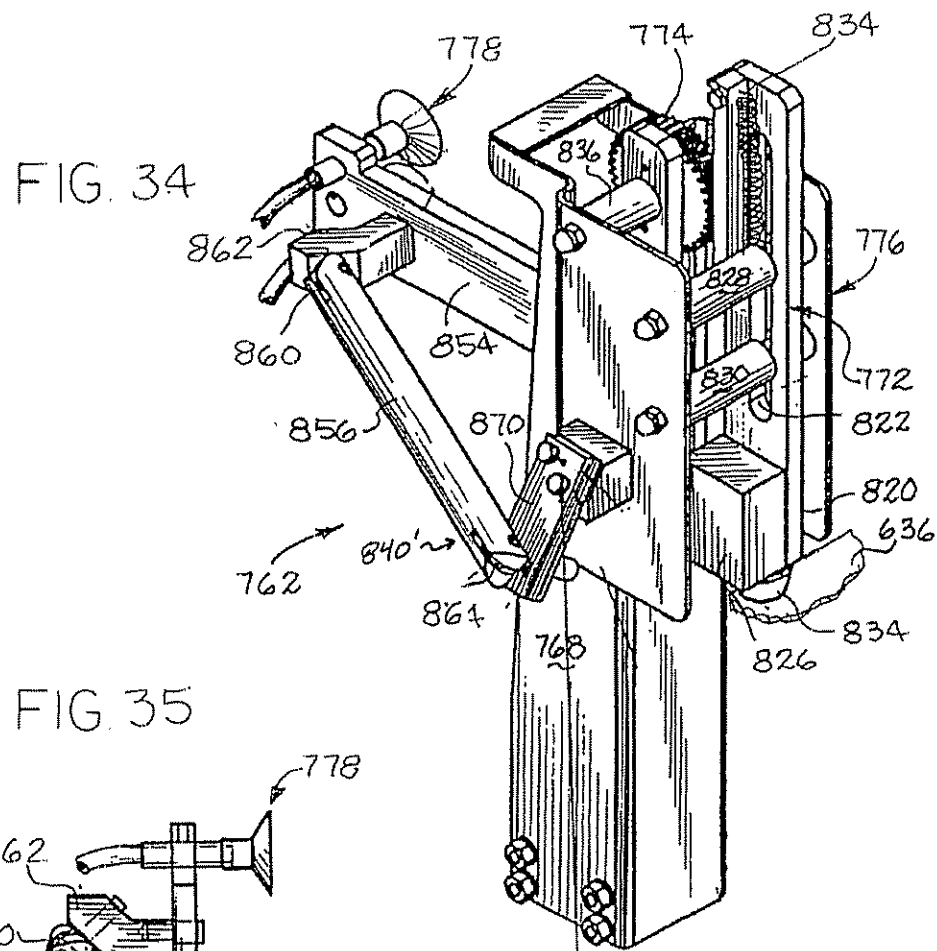
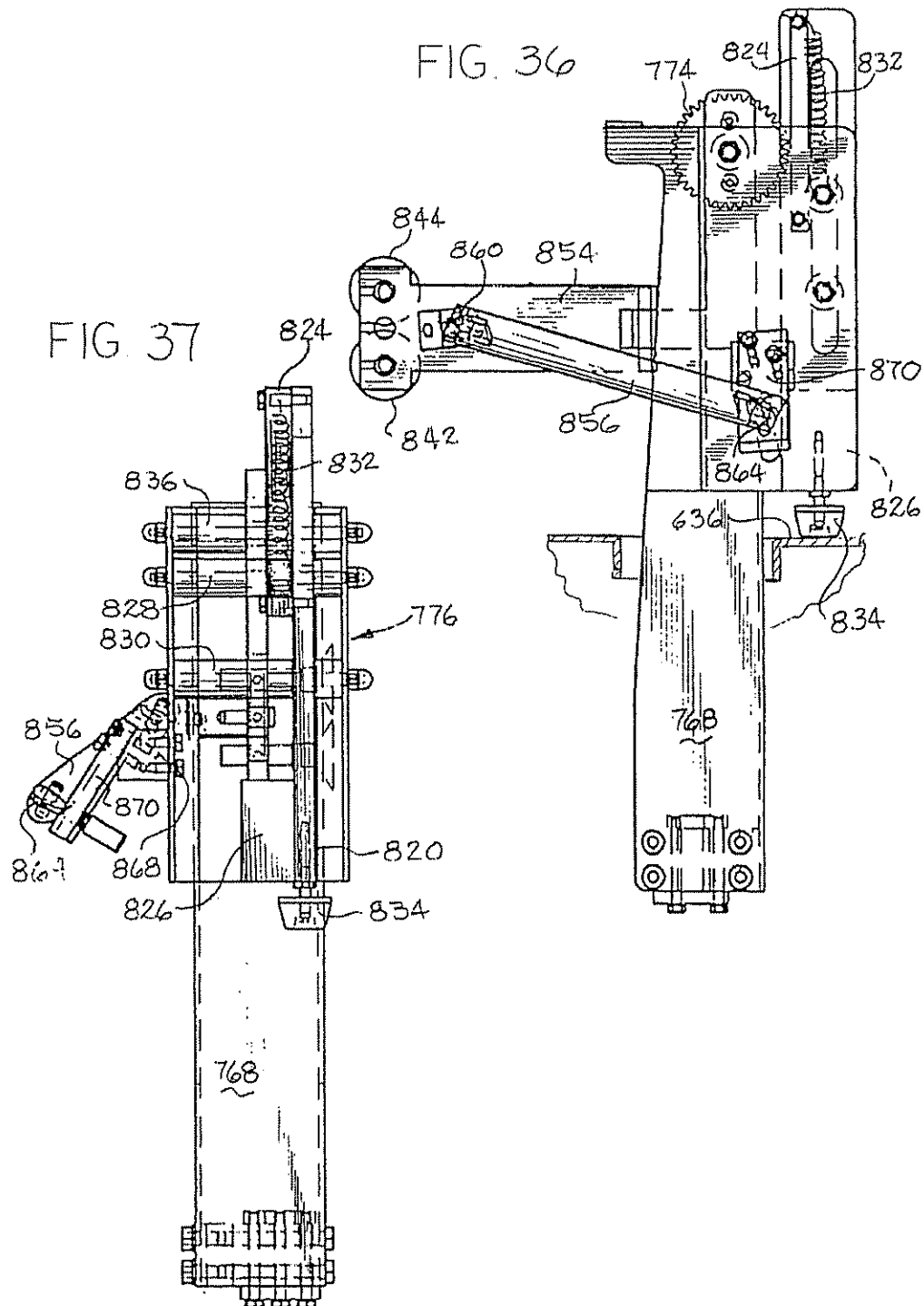
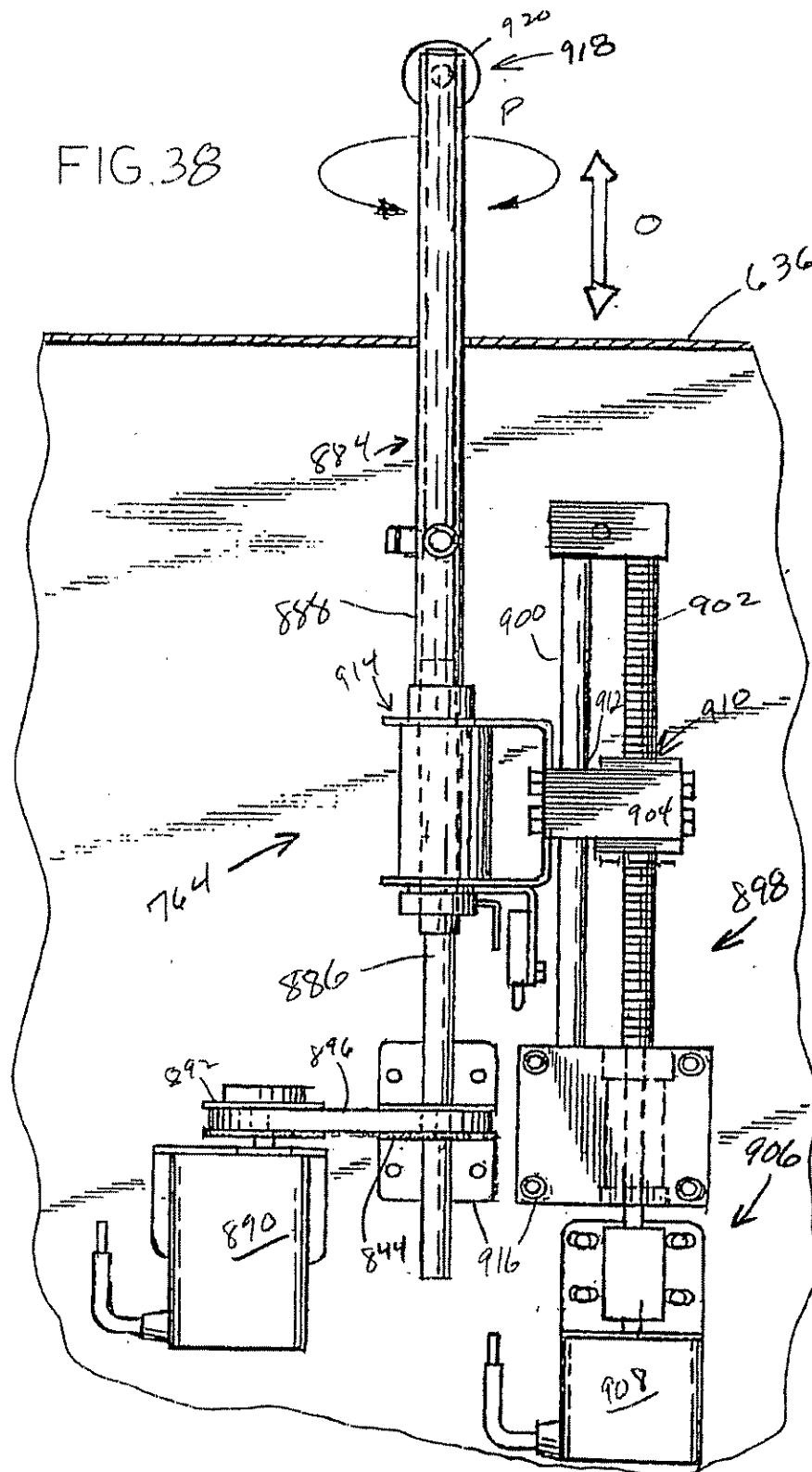


FIG 33









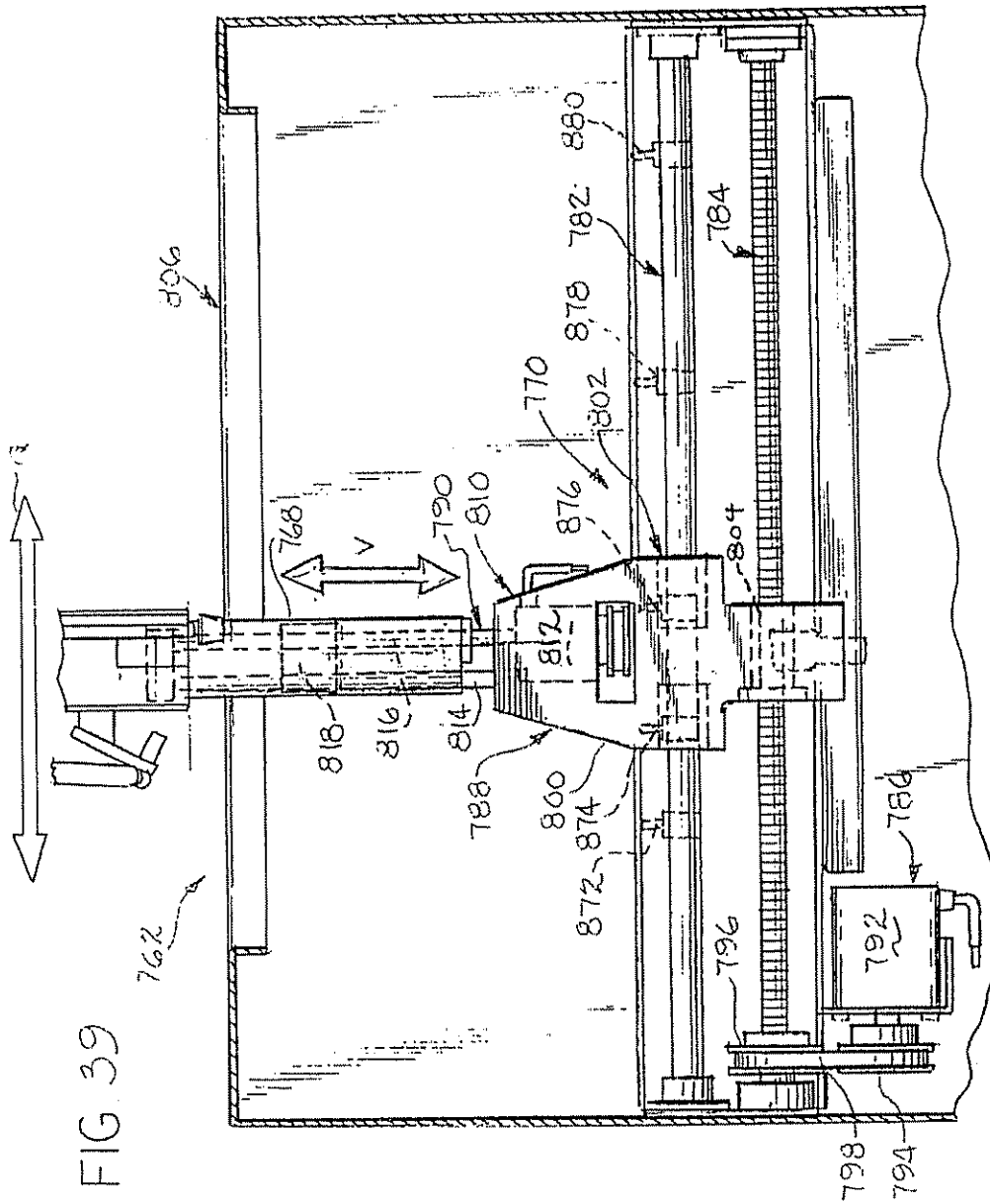


FIG 40

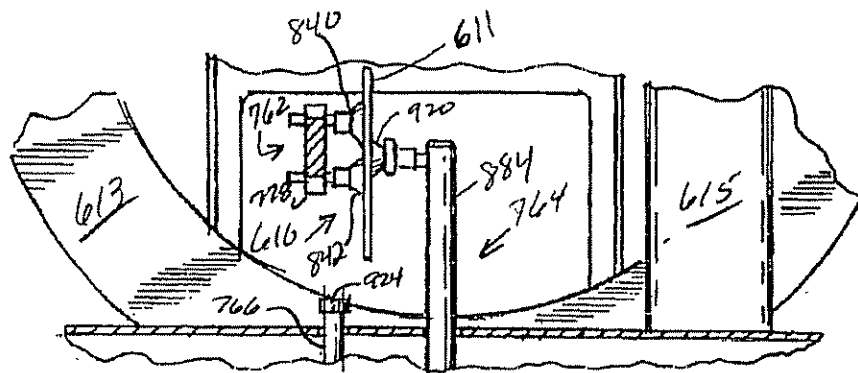


FIG 41

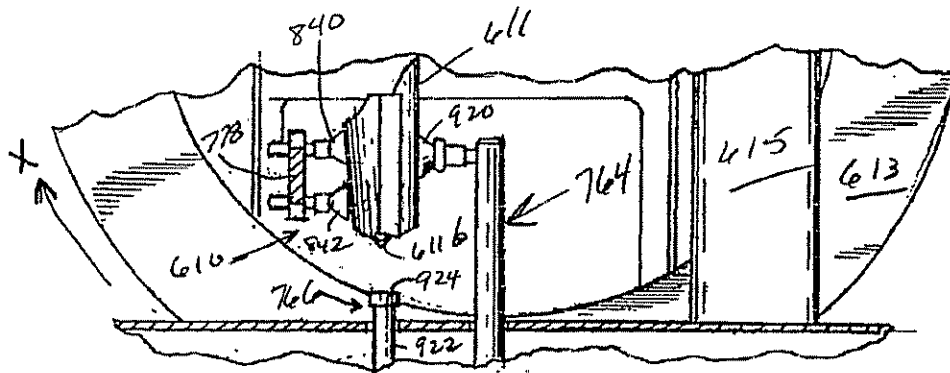


FIG 42

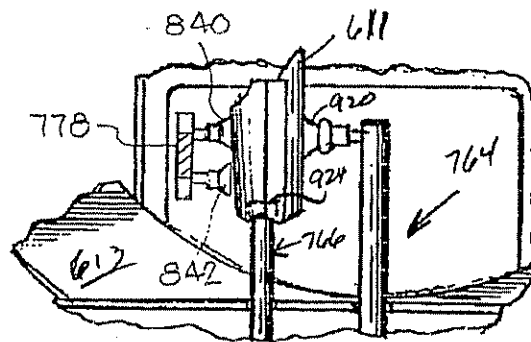


FIG 43

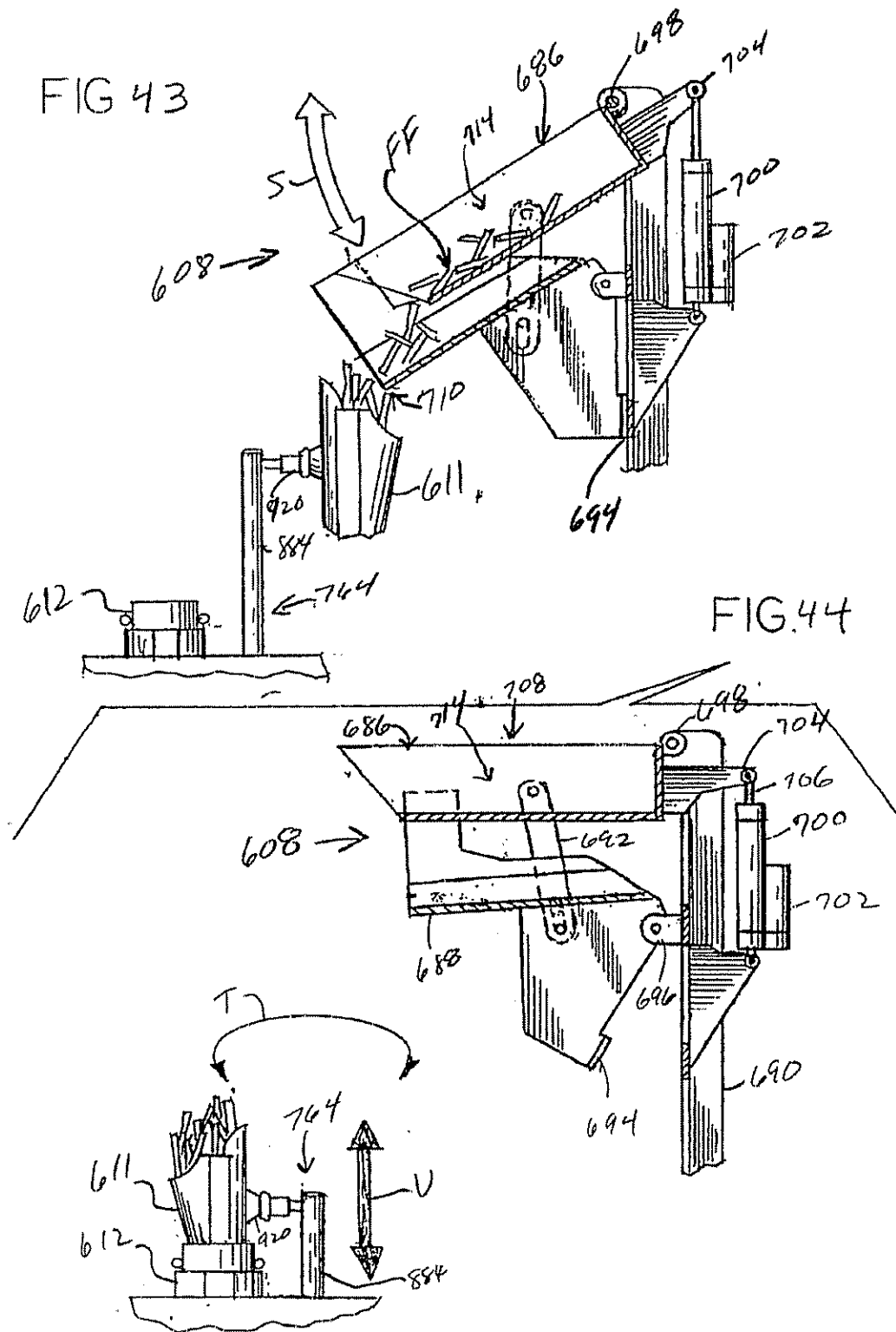
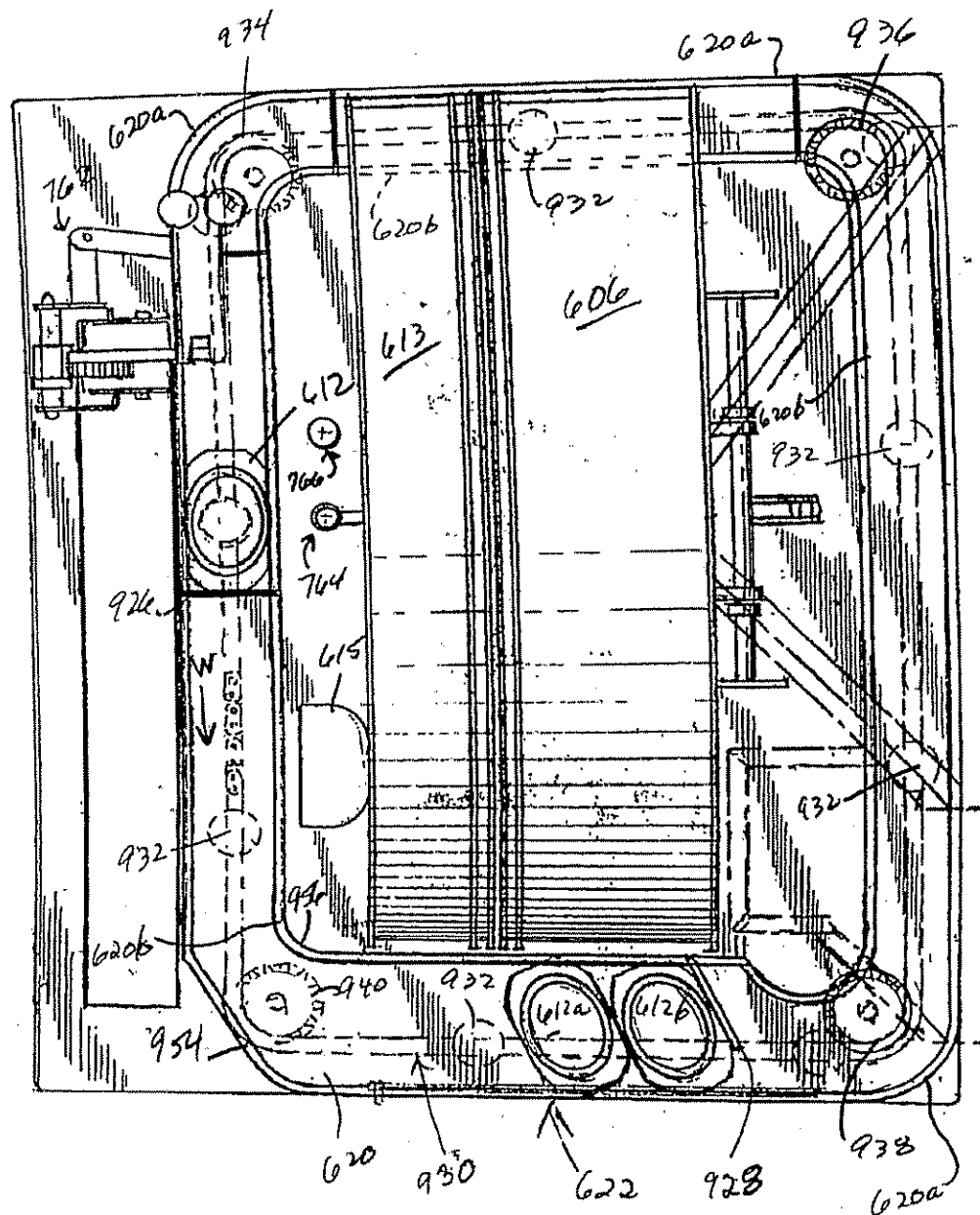


FIG 45



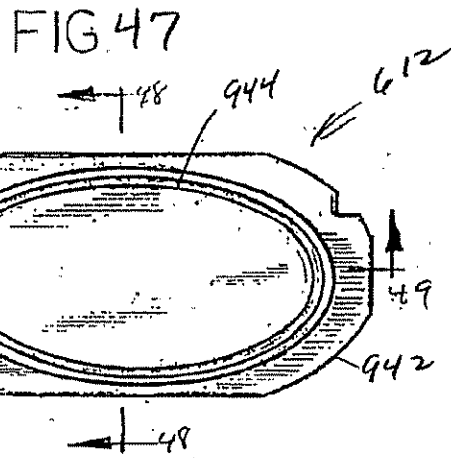
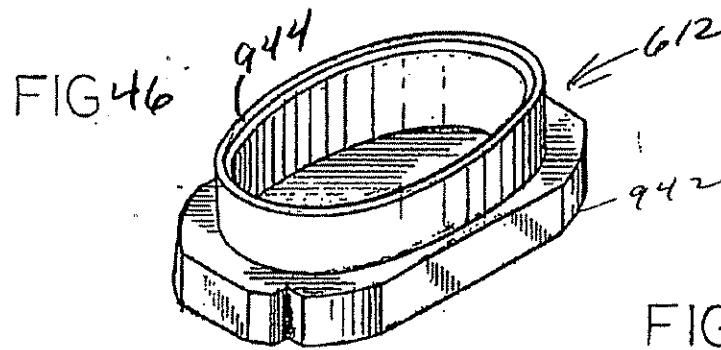
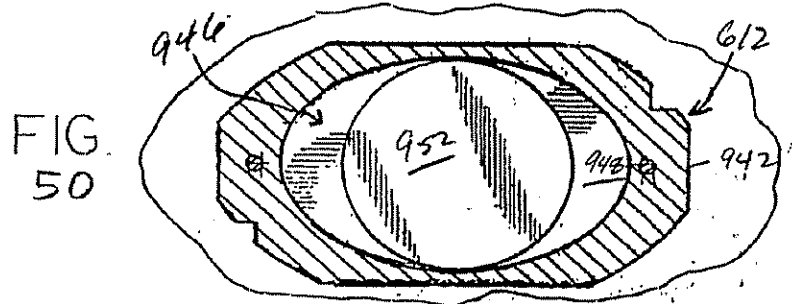
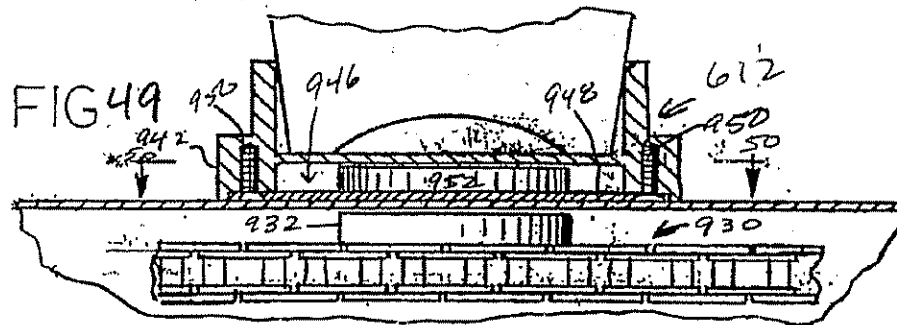
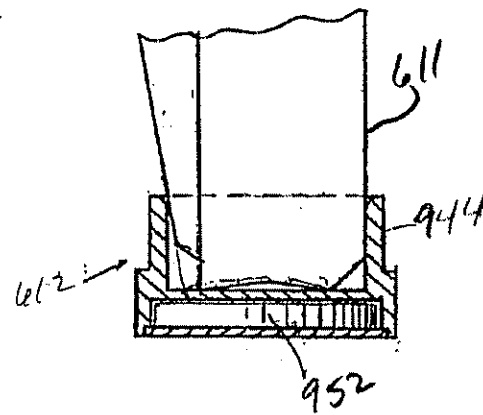


FIG 48



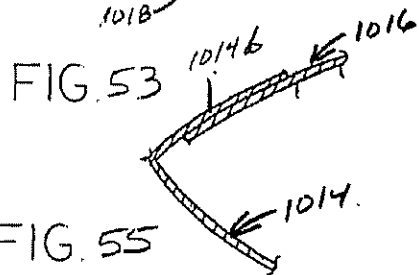
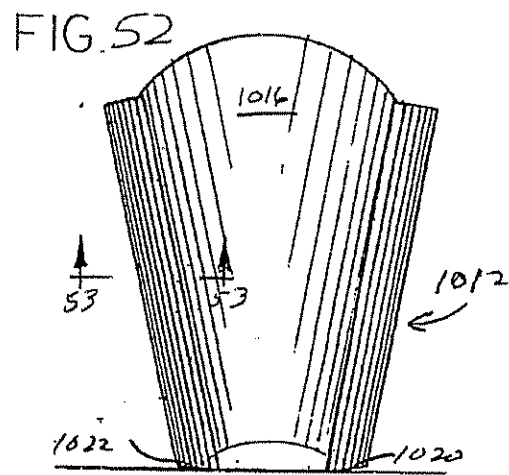
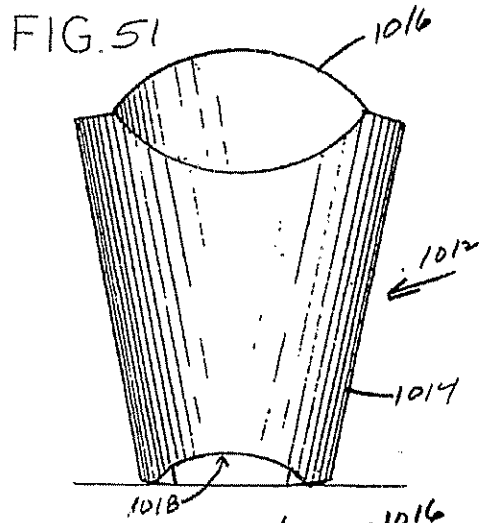


FIG. 54

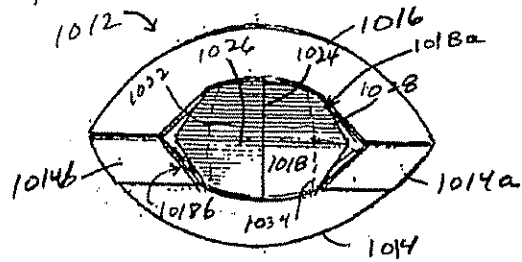


FIG. 55

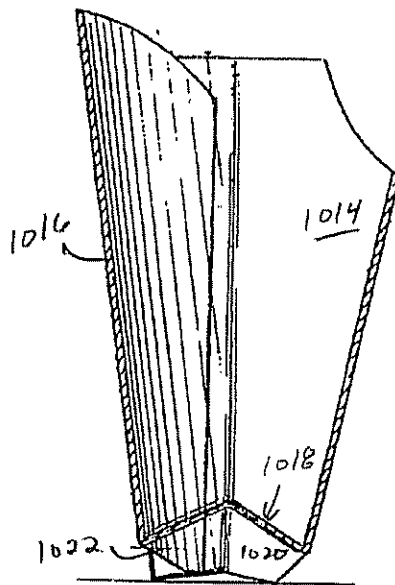


FIG. 56

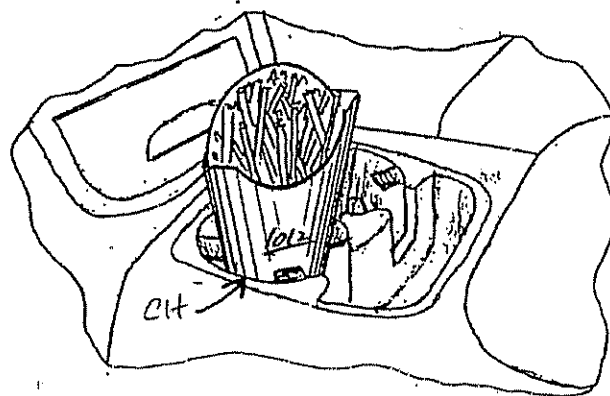


FIG. 57

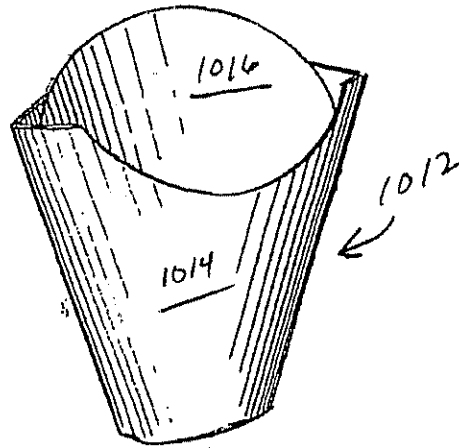


FIG. 58

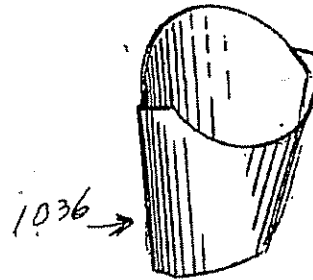


FIG. 54

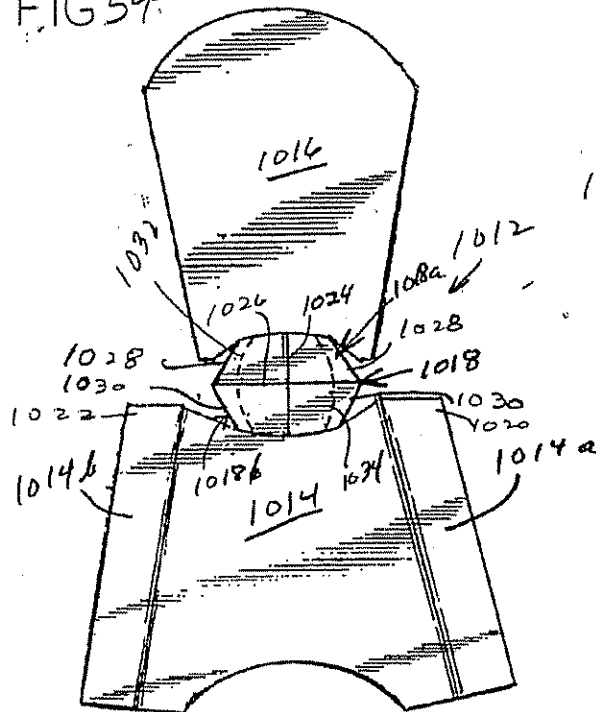
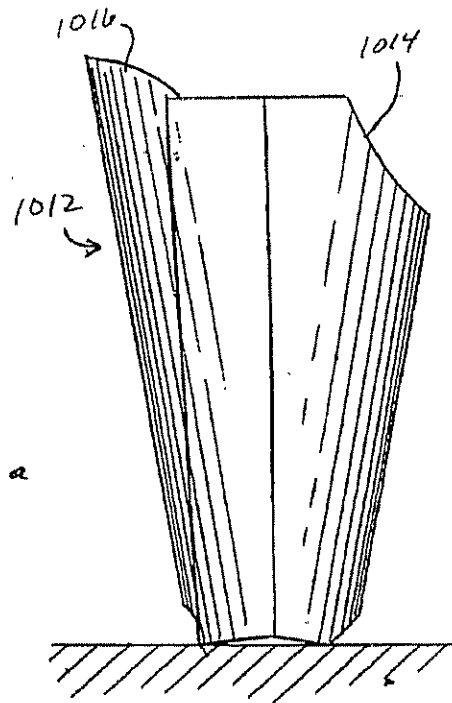
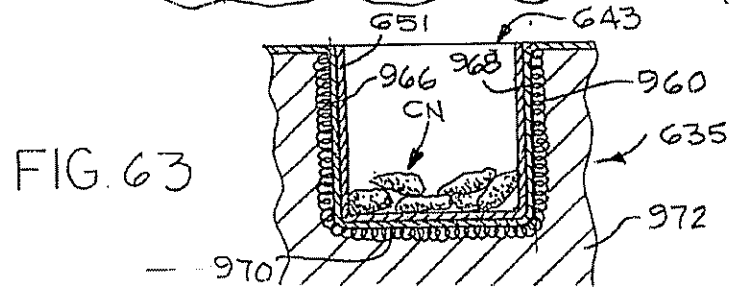
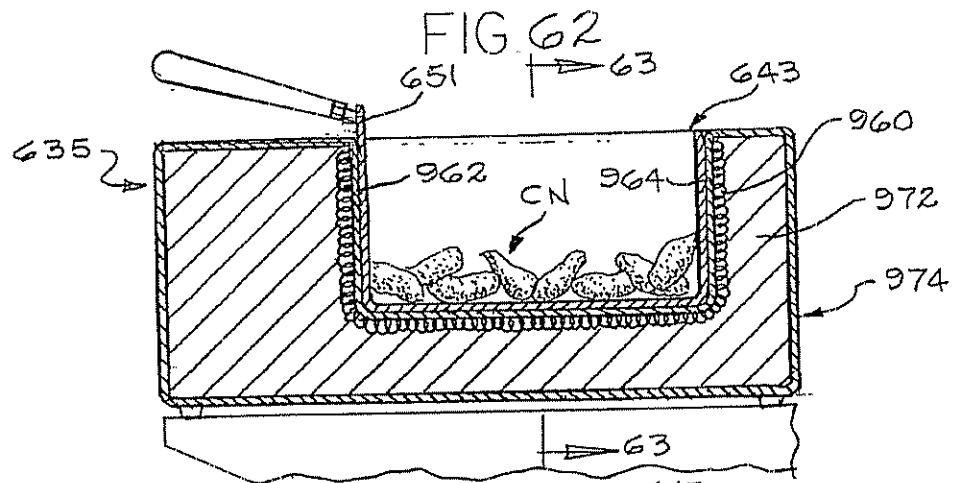
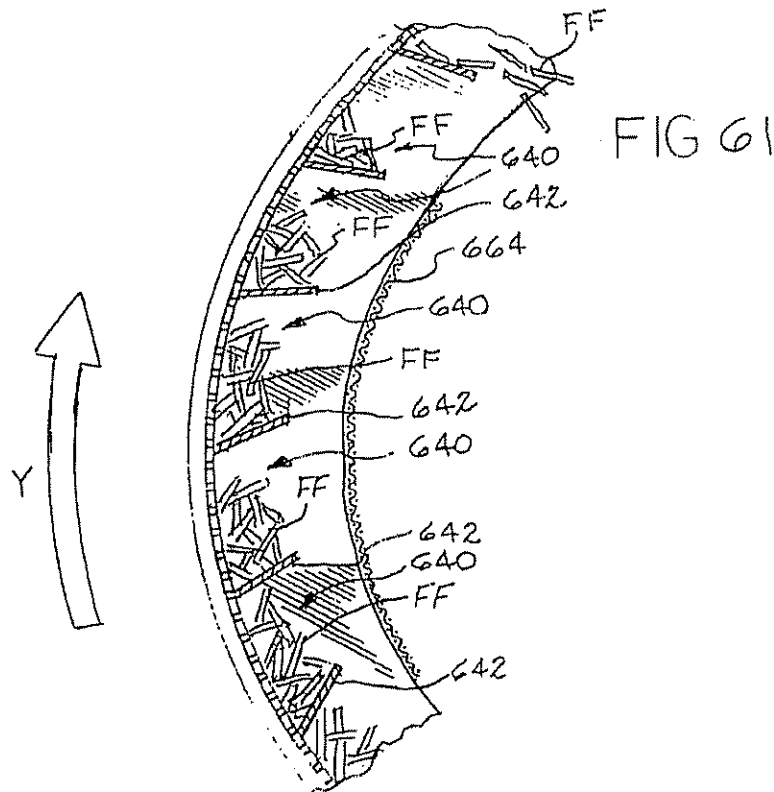
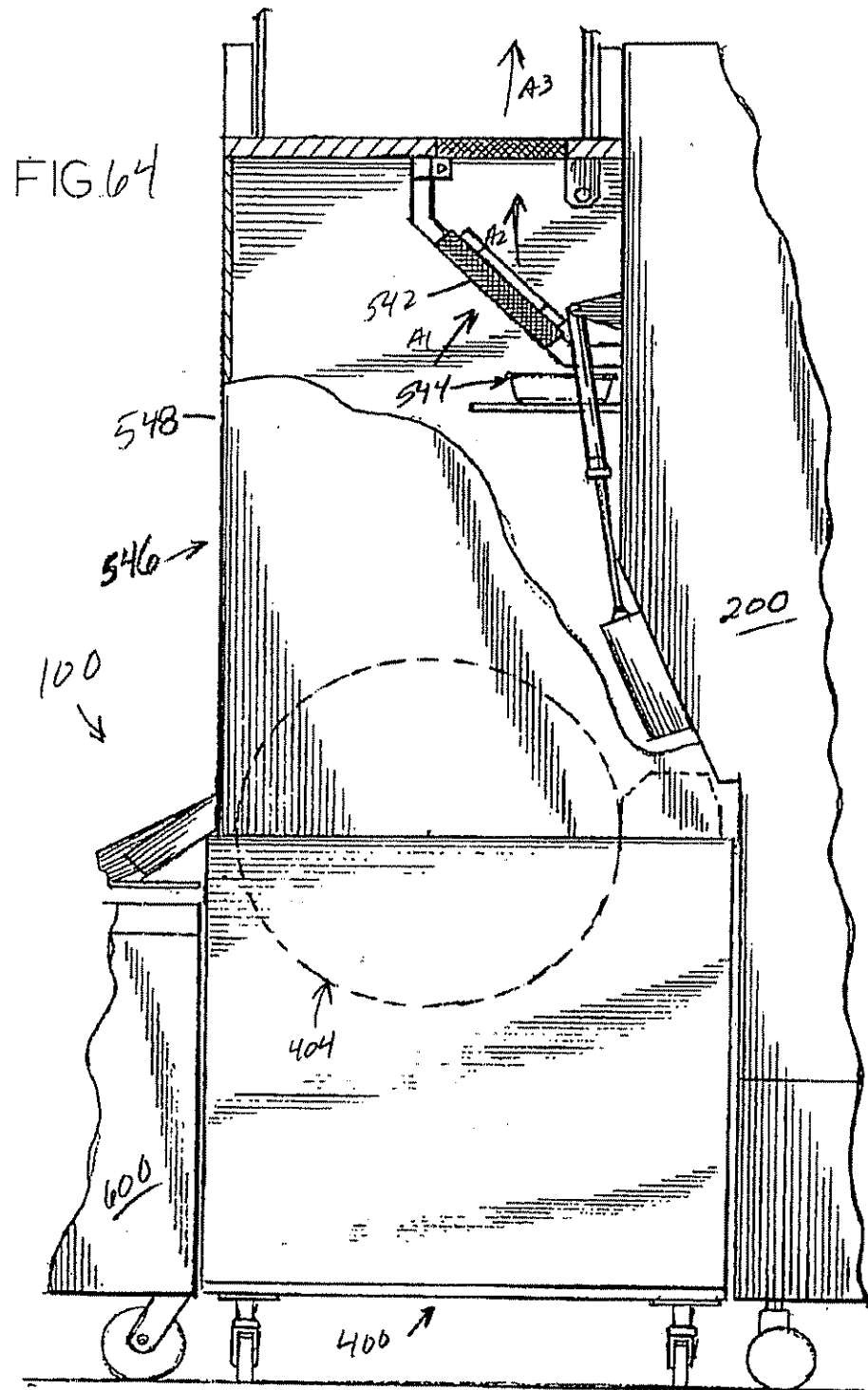
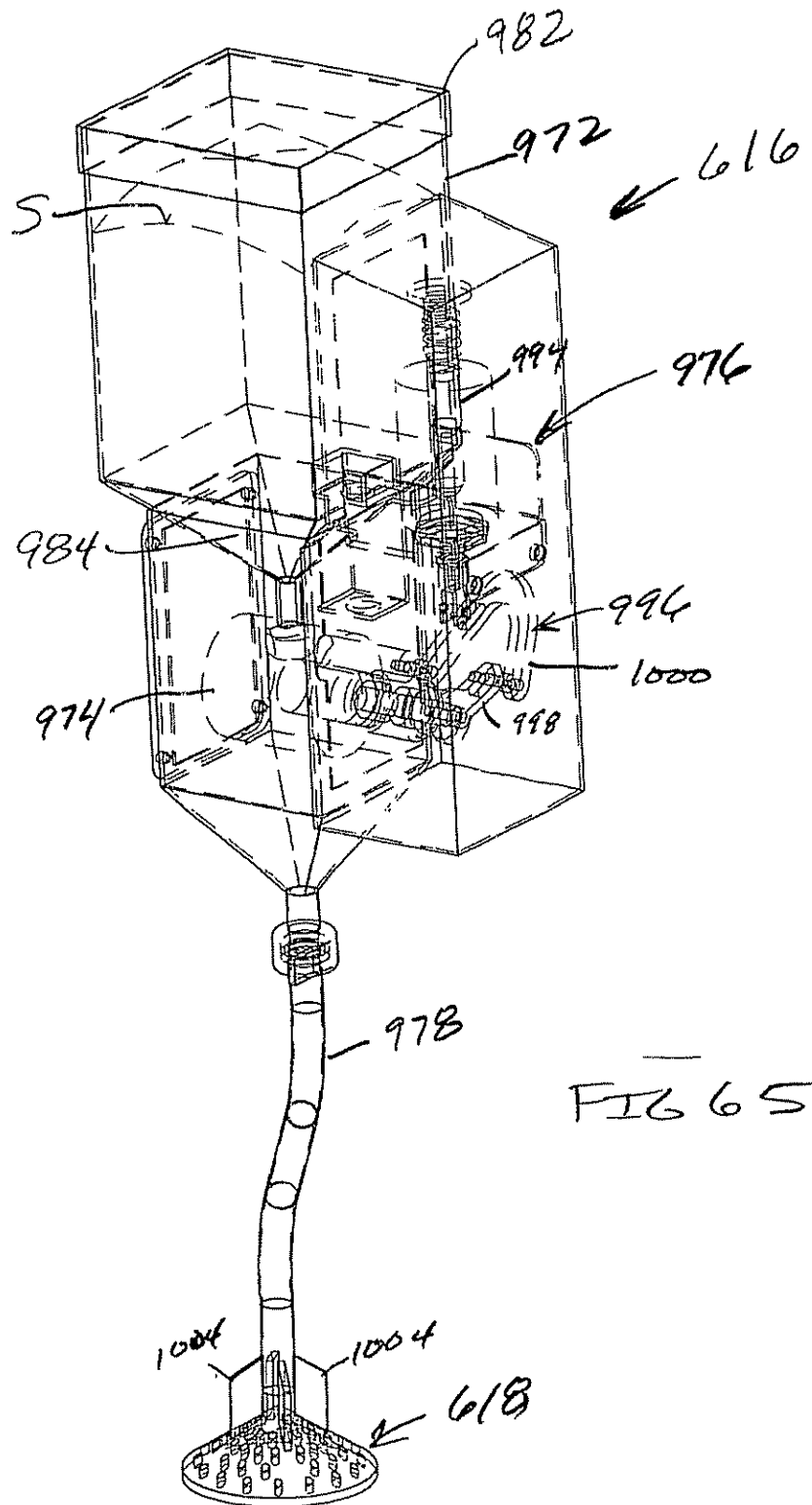


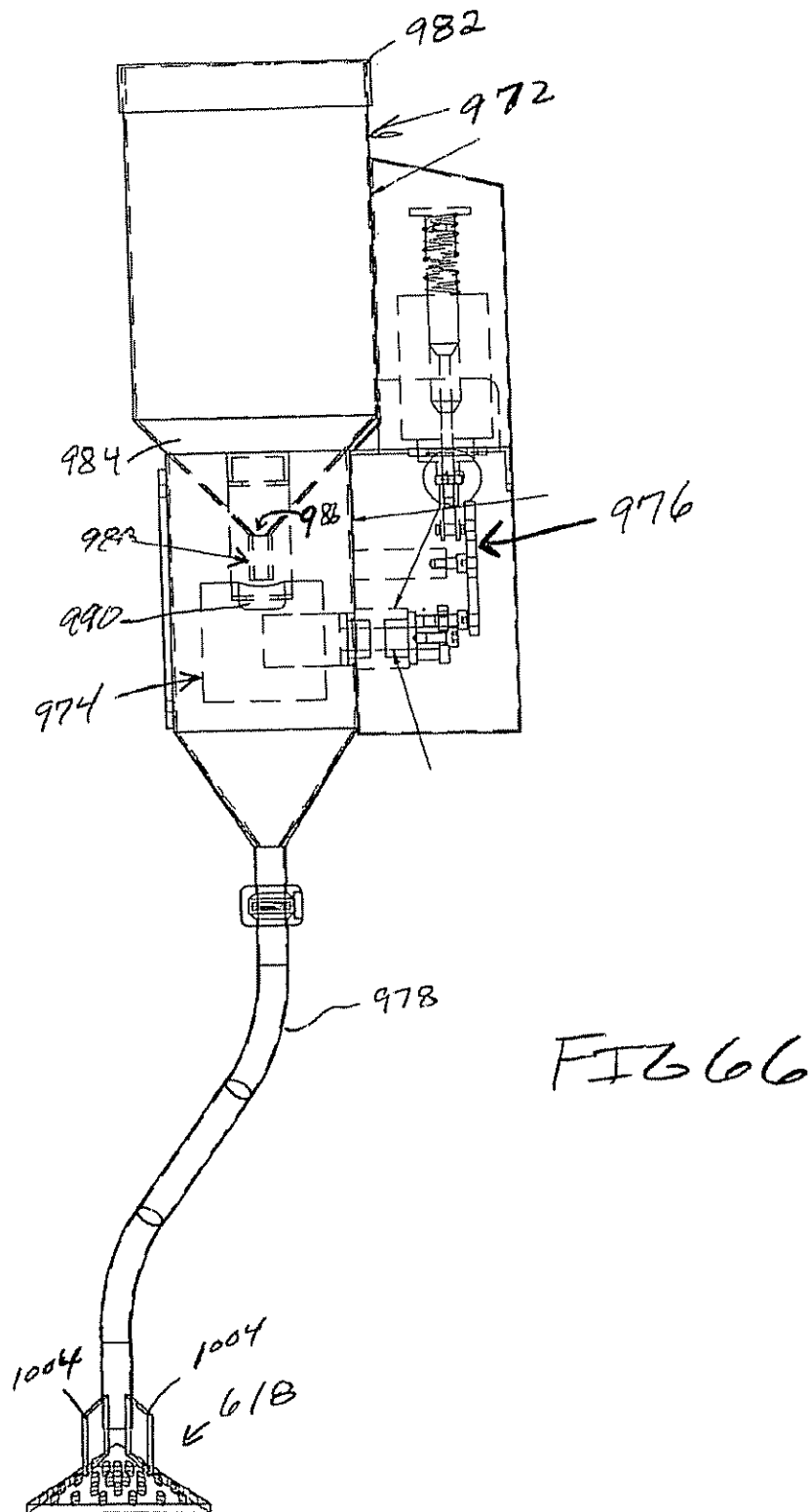
FIG. 60

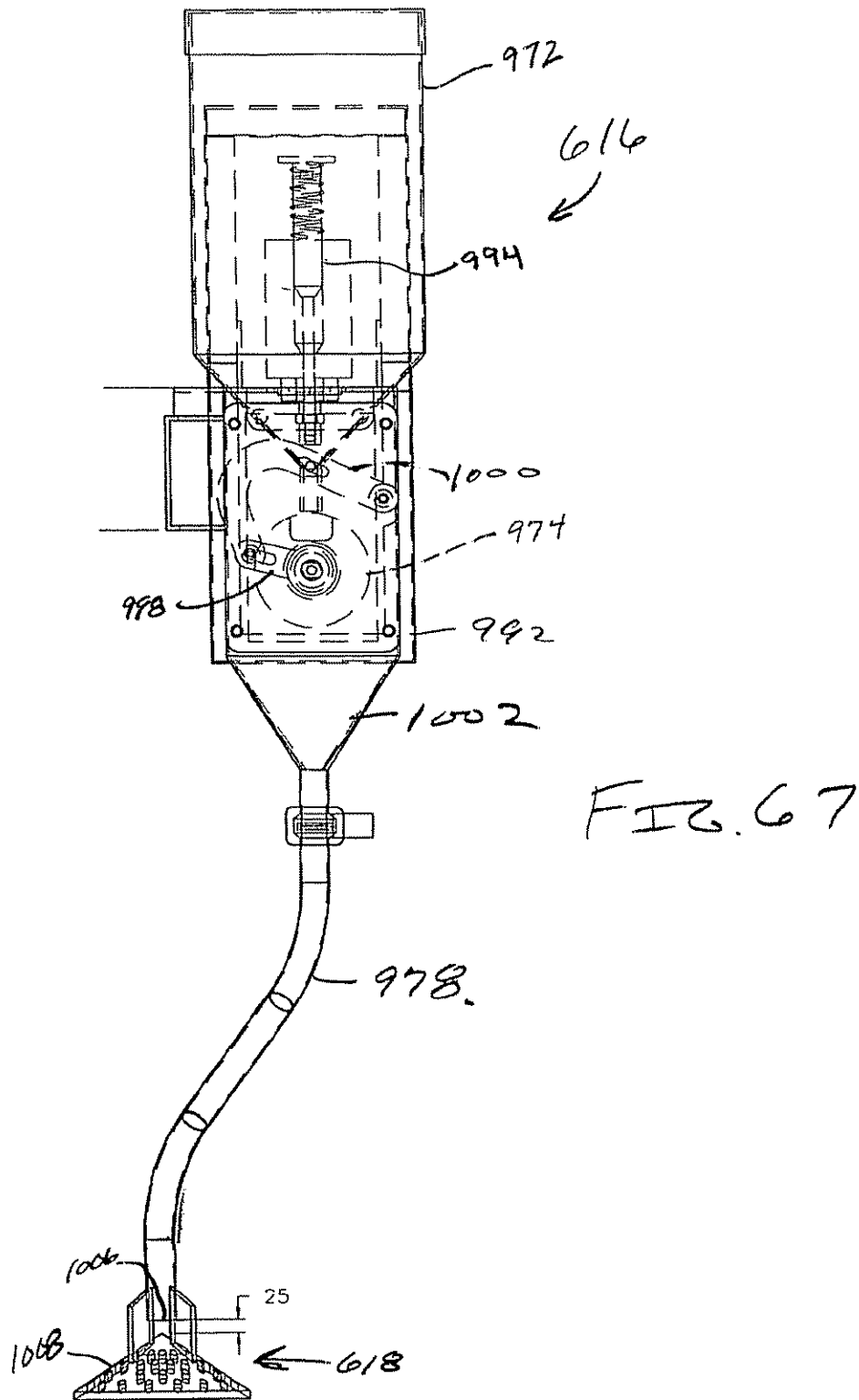












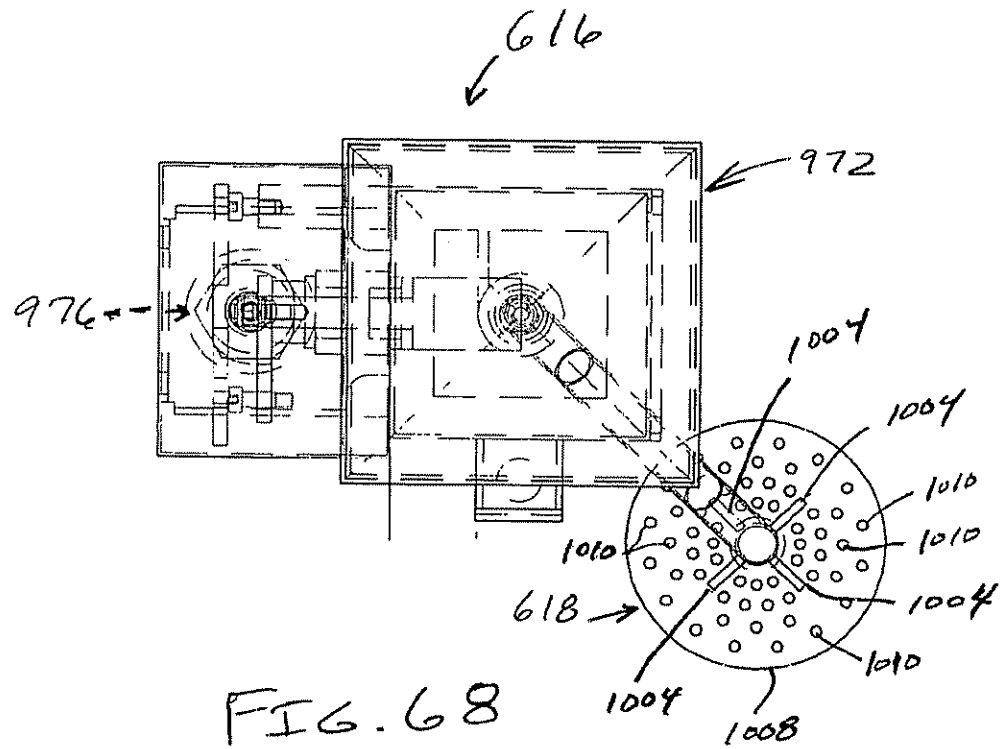


FIG. 69

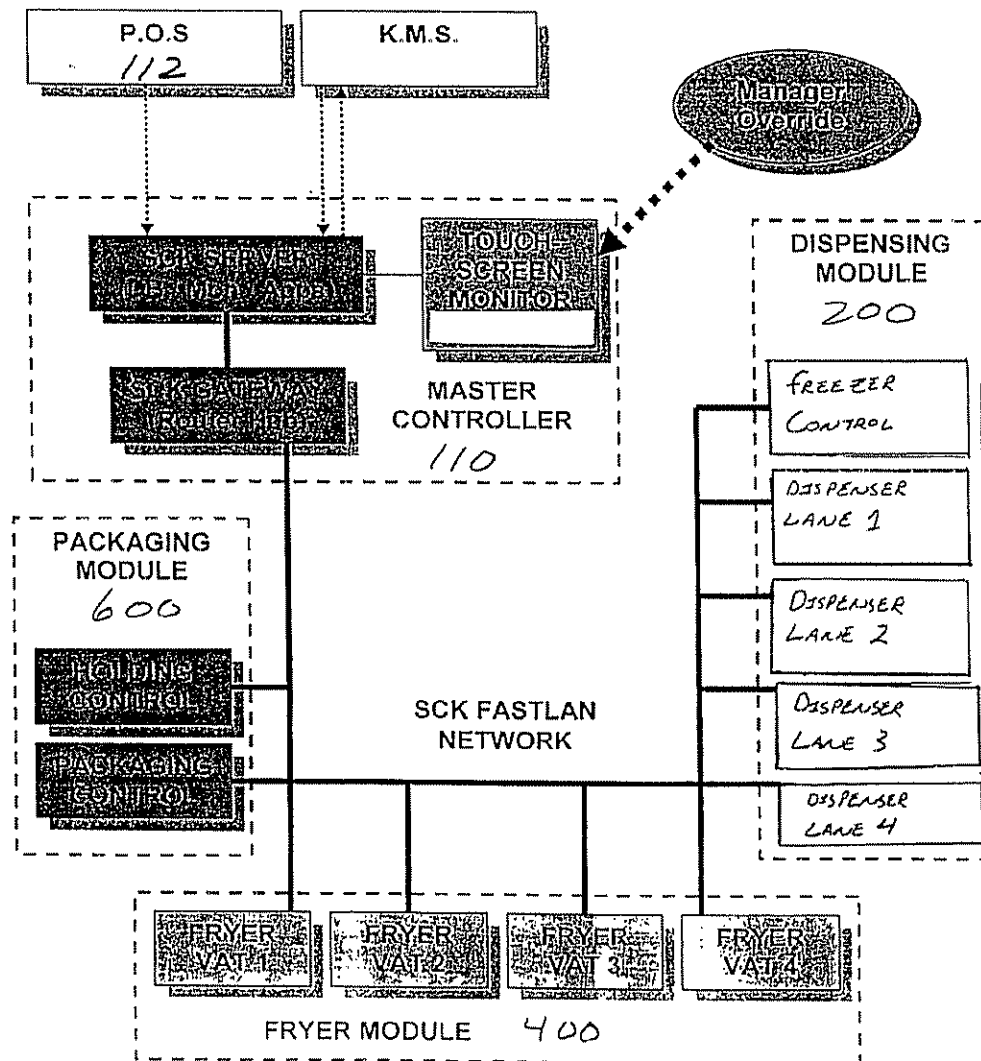


FIG. 70

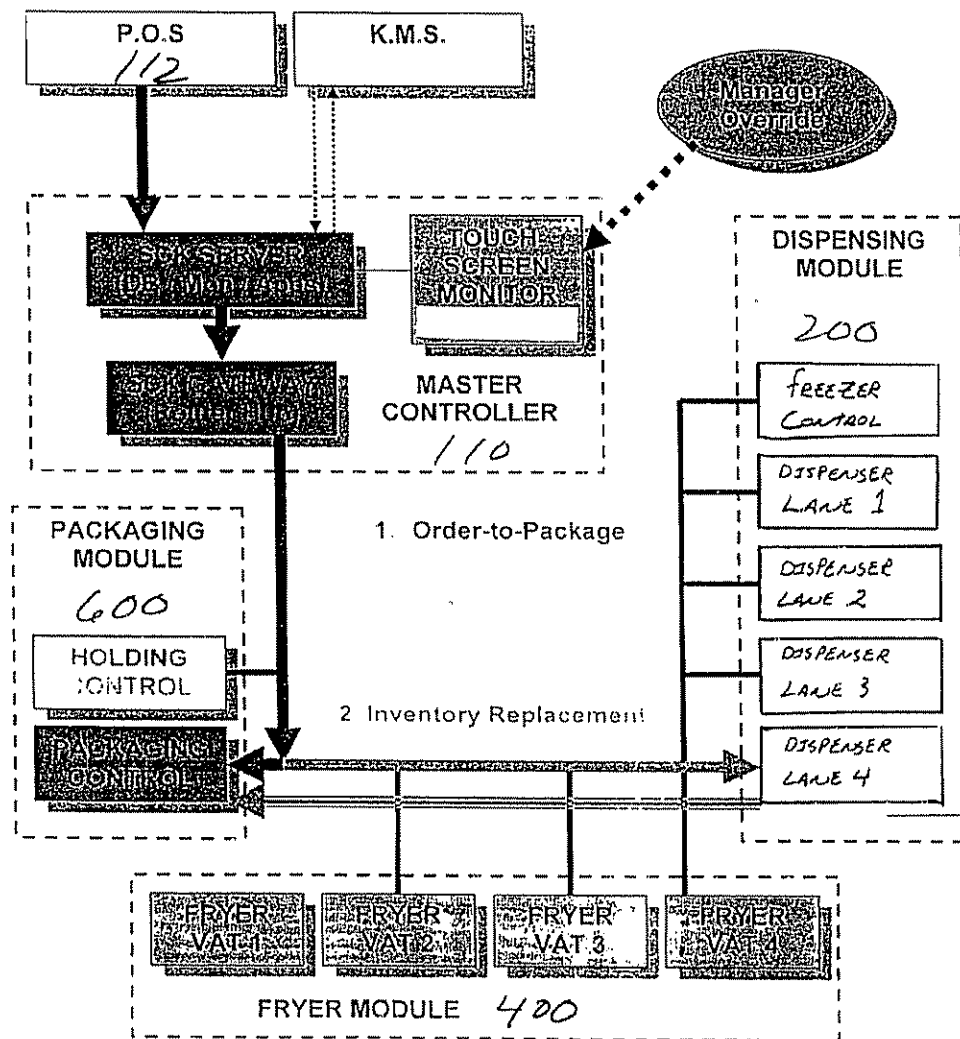


FIG. 71

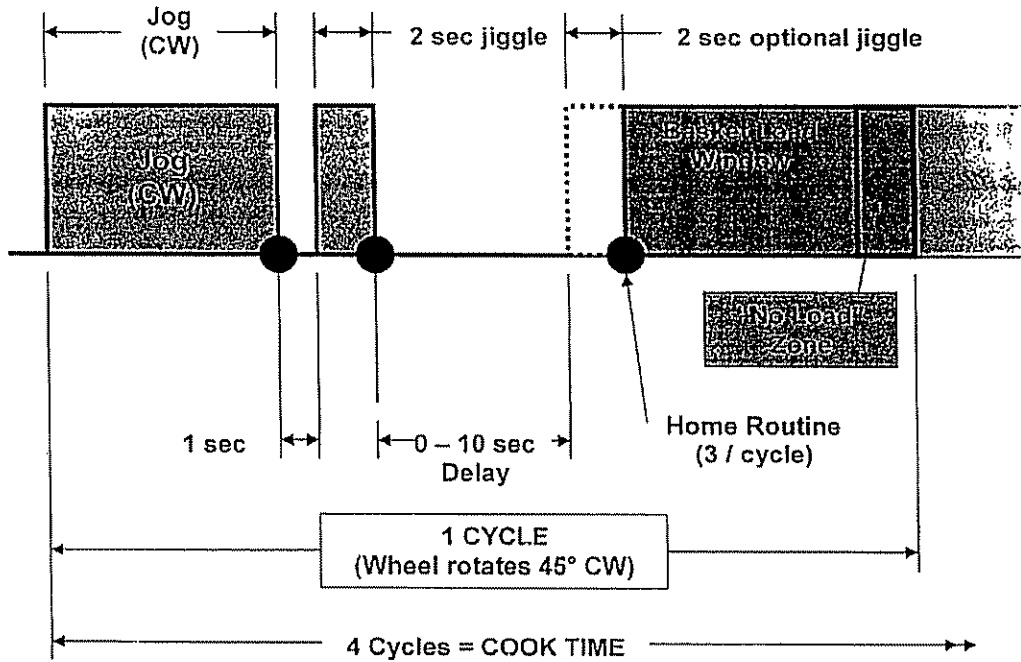


FIG. 72

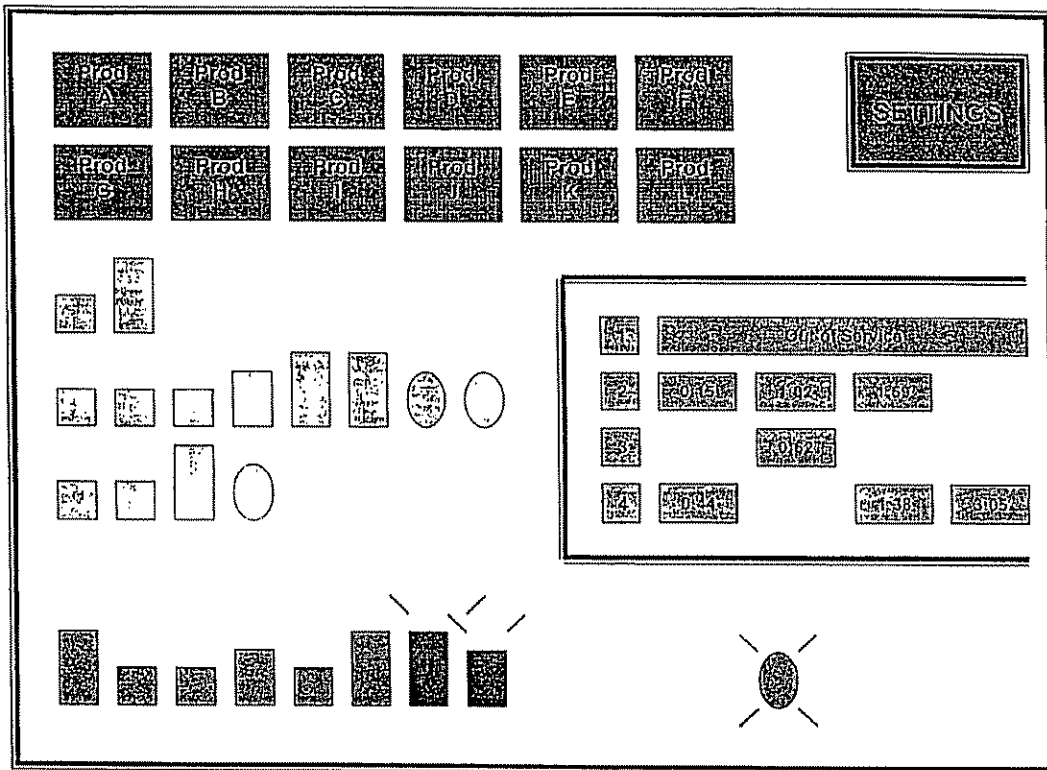





Fig. 73

Lane 1	Out of Service			
Lane 2	French Fries	Vat Temp	Set 375 F	Act 374 F
Lane 3	French Fries	Cook Time	Set 3:10	
Lane 4	Hash Browns	Cook Time	Set 3:23	
Pkg Temp Set 155F Act 153F		Freezer Temp Set -10F Act -10F		  

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AUTOMATED FOOD PROCESSING SYSTEM AND METHOD

FIELD OF THE INVENTION

[0001] The invention relates to automated food processing. More particularly, the invention relates to automated food dispensing, frying and packaging into individual portion-sized containers such as at a quick-service type restaurant.

BACKGROUND OF THE INVENTION

[0002] In restaurants, especially quick service (fast food) restaurants, fast, consistent, efficient and safe food preparation is essential for a successful operation. The quality of the prepared food depends in large part on the consistency of food preparation. The food must be cooked under correct conditions for the proper time.

[0003] Consistency in food preparation can vary as a result of many factors. For example, people engaged in food preparation often must perform multiple tasks at frequencies that vary with time because of constantly varying customer demand throughout the day. For example, lunchtime and dinnertime may be extremely busy while other periods may be relatively slow. The product mix can vary from hour to hour and day to day. As a result, the consistency and quality of food may vary. Difficulties in proper scheduling of food production during peak and non-peak periods can cause customer delays and/or stale, wasted or unusable food.

[0004] Food preparation can be labor intensive, and thus, the labor cost can be a large portion of the total cost of the prepared food. An additional problem is that in sparsely populated and other areas where quick service restaurants are located, such as along interstate highways, for example, recruiting sufficient numbers of suitable employees is difficult.

[0005] Quick service restaurants must be able to effectively meet a variable customer demand that is time dependent and not subject to precise prediction. As a result, stores relying totally on human operators will at times be over-staffed and at other times be under-staffed. Also, problems and potential problems can exist in restaurants where people directly prepare food. Health and safety concerns can also be present where food is prepared directly by people. By reducing or minimizing human contact with food and food cooking equipment, health and safety concerns can also be reduced or minimized. For example, in the frying of foods, some type of hot fluid, such as cooking oil or shortening must be utilized. The cooking temperatures required can present a concern for health and safety.

[0006] Although quick service restaurants have existed for many years and now number in the tens of thousands, such establishments utilize manual labor to prepare and process food. While there have been various improvements in commercial equipment used for cooking food in quick service restaurants, such restaurants are believed to be substantially all manually operated and relatively labor intensive.

[0007] Accordingly, a need exists for an automated, commercially suitable food dispensing, cooking and packaging device, system and method for fried foods that can be operated with a minimum of human intervention, control and maintenance. More particularly, a need exists for an

automated device, system and method that is capable of, without human labor, frying various food products in desired quantities, such as French fries, seasoning the cooked food and packaging the cooked food in individual portion-sized containers.

SUMMARY OF THE INVENTION

[0008] In accordance with the present invention, an automated food processing system and method is provided. The automated food processing system and method in accordance with the invention allows food to be dispensed, fried and packaged in a suitable container or alternatively dispensed to a food holding area for subsequent processing by a human operator.

[0009] In accordance with one aspect of the present invention, an automated module system for dispensing, frying and packaging food into individual portion-sized containers is provided. In one embodiment, any suitable automated dispensing device can be used. In another embodiment, the system includes an automated dispensing module capable of dispensing a desired quantity of food to be fried, an automated fry module adjacent the dispensing module to receive and fry the quantity of food dispensed from the dispensing module and to produce and dispense a quantity of fried food and an automated packaging module adjacent the fry module to receive and package the fried food from the fry module into an individual portion-sized container.

[0010] Advantageously, in one embodiment, the three modules are independent from each other and can be operated independently. Plus, in one embodiment, any one of the modules can be deactivated and a human operator can manually perform the function of the deactivated module with manually operated equipment.

[0011] In accordance with another aspect of the invention, optionally an automated seasoning device is present to apply seasoning to the food.

[0012] Typically, the automated dispensing module in accordance with the invention in one embodiment is capable of dispensing one or more of uncooked or unheated French fries, chicken nuggets, hash browns, chicken patties and fish filets or similar types of food items to be cooked and/or heated.

[0013] In accordance with another aspect of the invention, the automated dispensing module includes a freezer, a storage container located in the freezer for containing food to be dispensed, structure for dispensing a predetermined quantity of food from the storage container into a secondary or dump container, with the structure for dispensing and the secondary or dump container being located in the freezer, and structure for dispensing the quantity of food from the secondary or dump container to a location outside of the freezer.

[0014] In accordance with another aspect of the present invention, the fry module of the automated modular system includes a fry vat for containing and heating cooking oil, at least one circular fry wheel having at least a generally circular perimeter in a plurality of compartments, each compartment having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel, which radial axis is disposed above the normal operating level of the frying oil or the

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cooking oil in the fry vat. A drive mechanism is provided for rotating the fry wheel. In one aspect of the invention, any suitable type of automated fry device can be utilized.

[0015] In accordance with another aspect of the present invention, a control system is provided for causing the drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of angular rotation (such as about 2-10°, for example) to simulate shaking of a fry basket. Such control can be accomplished electronically by devices known to those skilled in the art.

[0016] In another embodiment, food is delivered from the fry module to a cooked food holding device, which can comprise a heated holding bin or bins.

[0017] In accordance with still another aspect of the present invention, the automated packaging module includes a rotatable food dispensing member having an inlet location to receive a quantity of cooked food at a discharge location to discharge cooked food, the packaging module also including a food dispensing chute position to receive cooked food from the discharge location of the rotatable food dispenser, the food dispensing chute having a discharge location.

[0018] In accordance with another embodiment of the invention, the automated modular system further includes a carton holding device for holding the individual portion-sized carton or container in position to receive food from the discharge location of the dispensing chute. The packaging module may further include a rotatable food collecting member disposed to collect food from the discharge location of a dispensing chute that is not deposited into the individual portion-sized food container. The so collected food may be subsequently deposited into the food dispensing chute for delivery to a container or alternatively to the rotatable food dispensing member or to a waste receptacle or chute.

[0019] In accordance with another aspect of the invention, the automated packaging device includes a conveyor system for transporting filled individual portion-sized food containers from adjacent the filling location to a filled food container holding area, for subsequent pick-up by a human operator, for example. In one embodiment, any suitable automated packaging device can be utilized.

[0020] In accordance with another aspect of the present invention, an automated food carton-retrieving device is provided for retrieving and grasping individual portion-sized food containers. The automated retrieving device comprises a moveable member for selectively grasping and releasing the food container. In one embodiment, the retrieving device is capable of grasping and releasing an unerected food container on one side and the device further includes a second device for selectively grasping the unerected food container on the other side with structure for moving the retrieving device and the second device relatively apart when grasping the sides of the container to erect or partially erect the container.

[0021] In another embodiment, an automated urging structure is provided for urging the container bottom upwardly relative to the sides of the container when the sides of the container are moved relatively apart.

[0022] In accordance with another aspect of the invention, the automated modular system includes an electronic control system that receives current customer order information and

the electronic control system causes the selection of a container from a plurality of different container sizes and further causes filling of food with the size of food container in response to a customer order. In one aspect, the electronic control system can receive customer order information and controls the dispensing rate of food dispensed from the food dispensing module to the fry module which dispensing automatically determines the amount of food being fried without further intervention by the electronic control. In one aspect, the control system can include a separate control system for each of the dispensing, fry and packaging systems or modules, each of which interface with a central control system, which in turn optionally interfaces with a POS (point-of-sale) system.

[0023] In accordance with another aspect of the invention, the automated modular system is suitable for dispensing, frying and packaging French fries into individual portion-sized containers.

[0024] In accordance with another aspect of the present invention, an automated method of dispensing, frying and packaging food into individual portion-sized containers is provided that includes dispensing a desired quantity portion of food to be fried from an automated dispensing module to an automated fry module and thereafter frying the portion of food dispensed from the dispensing module in the automated fry module adjacent the dispensing module to produce a quantity of fried food. Thereafter, the quantity of fried food is dispensed from the fry module to a packaging module where the fried food dispensed from the fry module is packaged into individual portion-sized containers with an automated packaging module.

[0025] In another aspect of the invention, the automated method further comprises seasoning the quantity of fried food with a seasoning device.

[0026] In accordance with another aspect of the invention, the dispensing includes dispensing a predetermined quantity of food from the storage container into a secondary container located in a freezer and dispensing the quantity of food from the secondary container to a location outside of the freezer.

[0027] In accordance with another aspect of the method of the present invention, the frying comprises a rotating fry wheel having at least a generally circular perimeter and a plurality of compartments, each compartment having an opening towards the perimeter, the food being contained in at least one of the compartments during the frying, the fry wheel being mounted for rotational movement relative to the radial axis of the fry wheel in a fry vat with the radial axis being disposed above a normal operating level of the cooking oil in the fry vat. In accordance with this aspect of the invention, the automated method further includes containing a drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of angular rotation to simulate shaking of a fry basket during frying.

[0028] In accordance with another aspect of the invention, the packaging includes rotating a rotatable food dispensing member having an inlet location to receive a quantity of cooked food in a discharge location to discharge cooked food, the food dispensing member being rotated to dispense food into a food dispensing chute position to receive cooked food from the discharge location of the rotatable food

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dispenser and thereafter dispensing said food from the dispensing chute to a container to be filled.

[0029] In accordance with another aspect of the invention, the method further includes holding an individual portion-sized carton or container positioned to receive food from the dispensing chute with an automated carton holding device.

[0030] In accordance with still another aspect of the invention, the method further includes collecting food dispensed from the discharge location of the dispensing chute that is not deposited into the individual portion-sized food container with a rotatable food collecting member disposed to collect such not deposited food.

[0031] In accordance with another aspect of the method, the method includes electronically coordinating the operation of the three modules or devices within an electronic control system. In one embodiment, the method further includes electronically receiving current customer order information by the electronic control system which causes selection of a container from a plurality of different sized containers and filling the container with food of the ordered size of food container in response to a customer order by the packaging module. In accordance with another aspect of the method, customer order information is electronically received and the dispensing rate of food dispensed from the food dispensing module to the fry module is controlled, which dispensing automatically determines the amount food being fried without further intervention by the electronic control system.

[0032] In accordance with another aspect of the present invention, an automated dispensing device for dispensing a quantity of food to be subsequently cooked is provided. In one embodiment, the automated dispensing device includes a freezer or refrigerated compartment, a storage container located in the freezer for containing food to be dispensed, structure for dispensing a predetermined quantity of food from the storage container into a secondary or dump container, the structure for dispensing the predetermined quantity of food being located in the freezer, and structure is provided for dispensing the quantity of food from the secondary or dump container in the freezer to a location outside of the freezer.

[0033] In one embodiment, the structure for dispensing a predetermined quantity of food includes a vibratory conveyor typically located in the freezer below the storage container. The structure for dispensing may further include a device for determining or sensing the quantity of food that has been deposited in the secondary container and structure is provided for terminating the operation of the structure for dispensing when a predetermined quantity of food is sensed in the secondary container.

[0034] In accordance with another aspect of the present invention, the automated dispensing device includes structure for dispensing a predetermined quantity of food that comprises a food magazine capable of dispensing individual pieces of food on a piece by piece basis. In accordance with a more specific aspect of this embodiment, the magazine comprises dual rotatable spiral flights with the spiral flights having a spacing therebetween to allow placement of a food item, such as a chicken patty, for example, to be supported by both spiral flights.

[0035] In accordance with another aspect of the invention, the magazine dispenser is suspended from a slide mecha-

nism permitting removal of the magazine from the freezer or refrigerated compartment. A plurality of the magazines can be located on a single slide mechanism. An array of the magazines may be located in the freezer, such as a 3x5 array or a 3x4 array, for example.

[0036] In one embodiment, a separate drive motor is associated with each food dispensing magazine for selectively rotating spiral flights of a magazine dispenser for dispensing a desired number of the food items. The drive motor may also be located in the freezer.

[0037] In accordance with another aspect of the invention, an automated method of dispensing a quantity of food to be cooked is provided. The method includes storing food items in a storage container located in the freezer, dispensing food items from the storage container to a conveyor, conveying the food items on the conveyor to a secondary or dump container located in the freezer, monitoring the amount of food items delivered to the secondary container, terminating delivery of the food items to the secondary container when a desired amount of food items are determined to be present in the secondary container as determined by the monitoring, and dispensing the food items from the secondary container and out of the freezer by at least partially inverting the secondary container. In accordance with another aspect of this embodiment, a freezer or refrigerated compartment is not utilized.

[0038] In accordance with another aspect of the present invention, a device for the automated frying of foods is provided. The device in one embodiment includes a fry vat for containing and heating cooking oil, at least one circular fry wheel having at least a generally circular perimeter and a plurality of compartments with each compartment having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel which radial axis is disposed above the normal operating level of the frying oil in the fry vat. A drive mechanism is provided for rotating the fry wheel and a control system is included for causing the drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of rotation (such as about 2-10°, for example) to simulate shaking of a fry basket. Such control can be accomplished electronically by devices known to those skilled in the art.

[0039] In accordance with another aspect of the present invention, the small amount of rotation is in the range of from about 2° to about 20°. The back and forth rotation in one direction may be of a larger angle or amount of rotation than of the rotation in the other direction.

[0040] In one embodiment, a control system is provided that causes periodic incremental rotation of the fry wheel in one direction to cause food deposited into one of the compartments to travel through the cooking oil in the fry vat over a period of time to fry the food and to move the compartments out of the cooking oil for subsequent discharge of the food from the compartment. In one embodiment, the periodic incremental rotation is based on 360° divided by the number of compartments in the fry wheel.

[0041] In accordance with another aspect of the present invention, a control system is provided for operating the drive mechanism to rotate the fry wheel in one direction to cause food deposited into one of the compartments to travel

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through the cooking oil in the fry vat over a period of time to fry the food and out of the cooking oil for subsequent discharge of the food from the compartment, wherein the control system adjusts the speed of rotation based on the level of cooking oil in the fry vat. In one embodiment, the control system causes incremental periodic rotation of the fry wheel and the control system adjusts the period of time between incremental rotations based on the level of cooking oil sensed in the fry vat. The period of time between incremental rotations can also be based on the temperature of the cooking oil in the fry vat.

[0042] In accordance with another aspect of the invention, a curved baffle is provided that is disposed in the fry vat adjacent the axial periphery of the portion of the fry wheel that is disposed in the cooking oil for preventing food contained in one or more of the fry wheel compartments from falling out of the compartments.

[0043] In accordance with another aspect of the present invention, an automated method of frying food in a fry vat having a heated cooking oil contained therein is provided. The method includes placing food in a fry wheel compartment, each of the compartments having an opening towards the perimeter of the fry wheel, rotating the fry wheel so that the compartment containing the food travels submerged in the heated cooking oil and periodically rotating the fry wheel back and forth in a relatively small amount of rotation to simulate shaking of the fry basket while the food is submerged in the cooking oil. In accordance with another aspect of the method of the present invention, the method comprises rotating the fry wheel in one direction to cause the food deposited into one of the compartments to travel through the cooking oil in the fry vat over a period of time to fry the food and to move the food out of the cooking oil for subsequent discharge of the food from the compartment, wherein the speed of said rotating is related to the level of cooking oil in the fry vat. In accordance with this aspect of the present invention, the rotating may comprise incremental periodic rotation with the period of time between incremental periodic rotations being based on the level of cooking oil sensed in the fry vat. The period of time between incremental periodic rotations may also be based on the temperature of the cooking oil in the fry vat.

[0044] In accordance with another aspect of the present invention, an automated method of packaging cooked food, which may be food such as French fries, chicken nuggets and other types of food, in an individual portion-sized container is provided. The method includes delivering a quantity of a cooked food to a rotatable dispensing member, rotating the dispensing member to cause the food items to fall from one or more compartments of the dispensing member into a food dispensing chute and thereafter dispensing the food from the chute and depositing the food into the individual portion-sized food container.

[0045] In accordance with one aspect, the method may further include weighing the food in the chute before dispensing the food to the container.

[0046] In accordance with another aspect of the invention, the method includes applying seasoning to the food and may further include applying the seasoning by using gravity to cause the seasoning to travel through a nozzle and onto the food.

[0047] In accordance with another aspect of the invention, the method further includes shaking the individual portion-

sized food container after the dispensing. The shaking may be automated and can include back and forth movement of the container through an arc as desired, and may be in a generally vertical axis. The arc may be a generally circular arc and the rotating back and forth may encompass an arc in the range of from about 3° to about 20°. In addition, the container may be raised and lowered before, during or after the rotating to further simulate shaking or in connection with further container handling.

[0048] In accordance with another aspect of the invention, when dispensing food from the chute to the individual portion-sized container, some of the dispensed food is not deposited into the individual portion-sized container and the method further includes collecting the not deposited food. Typically, the not deposited food will be collected in a collection device that returns the not deposited food to the chute for subsequent dispensing. In one embodiment, the collection member is rotatable and can be rotated to deposit the collected food to the chute. This helps to ensure that the not deposited food is subsequently deposited into a container on a first-in, first-out or a generally first-in, first-out basis.

[0049] In accordance with another aspect of the present invention, an automated method of packaging food, including food such as French fries, in an individual portion-sized container is provided that includes delivering a quantity of food to a food dispensing chute, selecting and holding with an automated device an individual portion-sized container of a desired size from a plurality of different sizes of individual portion-sized containers that can be selected and held by the automated device. The selected individual portion-sized container is moved by the automated device to a location for receiving food from the dispensing chute and food is dispensed from the chute and into the container. The method may further include depositing the filled food container onto a conveyor by operation of the automated device and transporting the deposited container by the conveyor to a human operator food pickup location.

[0050] In accordance with another aspect of the foregoing method, the individual portion-sized food container is unerected and the method further includes after the selecting, erecting the selected individual portion-sized food container by the automated device. In one embodiment, the automated device includes a partial vacuum suction device for holding the individual portion-sized food container and the holding includes applying a partial vacuum through a suction device to the food container. The food container can be released by reducing or eliminating the vacuum applied by the suction device to the food container sufficiently to cause the food container to be disengaged from the automated device.

[0051] In accordance with another embodiment of the method, the filled food container is placed in an upright position on a transportable member or container-receiving receptacle which in one embodiment contains a single food container and is maintained in an upright position on the transportable member by cooperation of the recessed volume of the transportable member and the food container.

[0052] In accordance with another aspect of the invention, the transporting is performed by a magnetic conveyor.

[0053] In accordance with still another aspect of the invention, an automated device for packaging cooked food

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into a desired container, which may be an individual portion-sized food container is provided. The device includes a rotatable food dispensing member having an inlet location to receive a quantity of the cooked food and a discharge location to discharge the cooked food. A food dispensing chute is positioned to receive the cooked food from the discharge location of the rotatable food dispenser and the dispensing chute has a discharge location. In one embodiment, the dispensing chute has a food holding area for holding a quantity of the cooked food deposited therein. A suitable weighing device can be associated with the dispensing chute to weigh the food that is contained in the chute or in the holding area of the chute. In one embodiment, the weighing device is a load cell.

[0054] In accordance with another aspect of the invention, the automated device includes a food carton or container holding device for holding the food carton in position to receive food from the discharge location of the dispensing chute. The carton holding device can include an axially rotatable generally vertically extending elongated first member and a second member that extends from the elongated member, the second member having a gripping member for gripping a food container, which may be an individual portion-sized food container. In one embodiment, the gripping member comprises a suction cup. A vacuum source may be supplied to the suction cup to create at least a partial vacuum, allowing the container to be held. In one embodiment, the carton holding device is capable of moving the food container through an arc of about or of at least about 180° and in which the carton holding device is capable of moving the food container up and down.

[0055] In accordance with another aspect of the present invention, the automated device comprises a conveyor system for transporting filled individual portion-sized food containers from adjacent the filling location to a filled container holding area. The conveyor system may comprise in one embodiment a continuous loop raceway and a plurality of discrete moveable food container receptacles that are moveable along the raceway. The conveyor system may include a continuous moveable loop having at least one magnetic element capable of magnetically attracting one of the moveable receptacles at a time for causing movement of the receptacle corresponding to movement of the magnetic element. A plurality of the magnetic elements may be spaced apart along the moveable loop.

[0056] In one embodiment, structure is provided for preventing movement of the discrete receptacles when the structure for moving the discrete receptacles along the raceway is activated. The structure for preventing movement can be a barrier that is disposed across the raceway. In one embodiment, the barrier is selectively moveable and in another embodiment the barrier is fixed. In one embodiment, the barrier prevents movement of the receptacles only for a receptacle that has a food carton or container disposed thereon. In this embodiment, the barrier may be located at a height that is above the top of the receptacles located on the conveyor system adjacent the barrier.

[0057] In accordance with another aspect of the invention, an automated device is provided to retrieve and grasp a food container, which may be an individual portion-sized food or French fry container or carton. The automated retrieving device includes a member for selectively grasping and

releasing the food container and for moving the moveable member horizontally and linearly.

[0058] In accordance with another aspect of the invention, a magazine is provided for holding a plurality of food containers in an unerected state.

[0059] In accordance with another aspect of the invention, the automated device includes a retrieving device that is capable of grasping and releasing an unerected food container on one side and further includes a second device for selectively grasping the unerected food container on the other side. A structure for moving the retrieving device and the second device relatively apart when grasping the sides of the container is provided. The automated device may further include an automated urging means for urging the container bottom upwardly relative to the sides of the container when the retrieving device and the second device are moved relatively apart when grasping the container.

[0060] In accordance with another aspect of the invention, the food dispensing member is a rotatable wheel having an open central area and an outer at least generally circular rim. The rotatable wheel has a plurality of open compartments spaced apart about the circular rim that extend inwardly from the circular rim and open interiorly of the circular rim. A baffle may be provided to prevent food contained in the one or more of the open compartments from falling out of the compartments when the wheel is rotated until the compartment is in position over the food dispensing chute. The baffle may be curved to follow the curvature of the inner part of the wheel and may also be perforated. The automated device may further include a rotatable food collecting member that is disposed to collect food dispensed from the discharge location of the dispensing chute which food is not deposited into a container held in position at the discharge location. Typically, the collection member will have a discharge location to discharge collected food. In one embodiment, the discharge location is the food dispensing chute. The collecting member may be a rotatable food collecting wheel having an open central area and an outer circular rim having a plurality of open compartments spaced apart about the circular rim that extend inwardly from the circular rim and that are open towards the rim interior. The rotatable food dispensing member and the rotatable food collecting member can be rotatable in one direction to discharge food at a discharge location and into a food dispensing chute and can be rotatable in an opposite direction to discharge the food at a second discharge location which may be to a waste chute. The discharge to the waste chute feature can be activated, for example, when the food is held in the dispensing device for too long a period of time.

[0061] The packaging device may also include an automated seasoning device for depositing a predetermined quantity of seasoning to food contained in the packaging device.

[0062] In accordance with another aspect of the invention, the device for applying seasoning includes a seasoning delivery tube having an inlet and a discharge location. A seasoning delivery head is positioned to deliver seasoning to the food to be seasoned with the head in communication with the outlet of the delivery tube and located below the inlet of the delivery tube. Structure is provided for depositing a predetermined quantity of seasoning into the inlet of the delivery tube so that the quantity of seasoning falls by

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gravity through the delivery tube and into and through the seasoning head and onto the food to be seasoned. Typically, the structure for depositing the predetermined quantity of seasoning will receive seasoning from a bulk hopper by gravity feed. The quantity of seasoning to be dispensed can be determined volumetrically, for example

BRIEF DESCRIPTION OF THE DRAWINGS

[0063] FIG. 1 is a perspective view of an automated food processing system in accordance with the invention;

[0064] FIG. 2 is a perspective view of an alternate embodiment of a food processing system in accordance with the present invention;

[0065] FIG. 3 is a schematic view, partly in section, of the food processing system of FIG. 1;

[0066] FIG. 4 is a side elevation view of a portion of a bulk food dispensing device in accordance with the present invention;

[0067] FIG. 4A is a side elevation view, partly in section, of an alternative embodiment for a portion of the dispensing device illustrated in FIG. 4;

[0068] FIG. 5 is a top plan view of a portion of the bulk food dispensing device in accordance with the present invention;

[0069] FIG. 6 is a side elevation view, partly in section, of a bulk food dispensing device in accordance with the present invention and also illustrating a portion of a device for frying food in accordance with the present invention;

[0070] FIG. 7 is a perspective view of a magazine-type dispenser that can form part of the food dispensing device of the present invention;

[0071] FIG. 8 is a partial side elevation view of the magazine dispenser of FIG. 7;

[0072] FIG. 9 is a perspective view of a magazine-type dispenser array that can be utilized in the dispenser of the present invention;

[0073] FIG. 10 is a fragmentary view of the device of FIG. 9;

[0074] FIG. 11 is a top plan view of a food frying device in accordance with the present invention;

[0075] FIG. 12 is a front elevation view of the food frying device of FIG. 11;

[0076] FIG. 13 is a partial fragment sectional view along line 13-13 of FIG. 11;

[0077] FIG. 14 is a fragmentary sectional view of a portion of the food frying device of FIG. 11;

[0078] FIG. 15 is a sectional view along line 15-15 of FIG. 14;

[0079] FIG. 16 is a perspective view of a drive mechanism for the food frying device of FIG. 11;

[0080] FIG. 17 is a fry basket for use in the frying device of FIG. 11;

[0081] FIG. 18 is a fragmentary sectional view along line 18-18 of FIG. 17;

[0082] FIG. 19 is an enlarged, fragmentary elevation sectional view of a portion of FIG. 13;

[0083] FIG. 20 is an alternate view along line 13-13 of FIG. 11;

[0084] FIG. 21 is a sectional view along line 21-21 of FIG. 20;

[0085] FIG. 22 is an enlarged fragmentary view of a portion of FIG. 21;

[0086] FIG. 23 is an alternate embodiment of a fry wheel in accordance with the present invention;

[0087] FIG. 24 is another alternate embodiment fry wheel in accordance with the present invention;

[0088] FIG. 25 is a front perspective view of a packaging device in accordance with the invention;

[0089] FIG. 26 is a rear perspective view of the device of FIG. 25;

[0090] FIG. 27 is a top plan view of the device of FIG. 25;

[0091] FIG. 28 is a side elevation view, partially in section and partially broken away of the packaging device of FIG. 25;

[0092] FIG. 29 is a front elevation view of the device of FIG. 25;

[0093] FIG. 30 is a front perspective view of a portion of an automated container handling system in accordance with the invention;

[0094] FIG. 31 is a top plan view of the container handling system of FIG. 30;

[0095] FIG. 32 is a side elevation view, partially broken away of the automated container handling system of FIG. 30;

[0096] FIG. 33 is a rear elevation view of the container handling system of FIG. 30;

[0097] FIG. 34 is a front perspective view of the container handling system of FIG. 30 shown in another operative position;

[0098] FIG. 35 is a top plan view of the container handling system of FIG. 34;

[0099] FIG. 36 is a side elevation view, partially broken away of the container handling system of FIG. 34;

[0100] FIG. 37 is a rear elevation view of the container handling system of FIG. 34;

[0101] FIG. 38 is a front elevation view of a portion of a container handling apparatus in accordance with the invention;

[0102] FIG. 39 is a front elevation view of another portion of the container handling apparatus of FIG. 34;

[0103] FIGS 40-42 illustrate a front diagrammatic elevation view illustrating a portion of the container handling apparatus in accordance with the invention;

[0104] FIGS 43-44 illustrate a side elevation view, partly in section, of a portion of the food packaging apparatus in accordance with the invention;

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[0105] FIG. 45 is a top plan view of a food packaging device in accordance with the present invention;

[0106] FIG. 46 is a perspective view of a container-receiving receptacle in accordance with the present invention;

[0107] FIG. 47 is a top plan view of the device of FIG. 47;

[0108] FIG. 48 is a sectional view along line 48-48 of FIG. 47;

[0109] FIG. 49 is a cross-sectional view along line 49-49 of FIG. 47 and further including a portion of a conveyor system in accordance with the present invention;

[0110] FIG. 50 is a sectional view along line 50-50 of FIG. 49;

[0111] FIG. 51 is a front elevation view of a carton useful in accordance with the present invention;

[0112] FIG. 52 is a rear elevation view of a carton useful in accordance with the present invention;

[0113] FIG. 53 is a sectional view along line 53-53 of FIG. 52;

[0114] FIG. 54 is a bottom plan view of the container of FIG. 51;

[0115] FIG. 55 is a sectional view along line 55-55 of FIG. 57;

[0116] FIG. 56 is a perspective view showing use of the food container of FIG. 51;

[0117] FIG. 57 is a perspective view of a food container useful in accordance with the present invention;

[0118] FIG. 58 is an alternate embodiment perspective view of a container useful in accordance with the invention;

[0119] FIG. 59 is a development view of the carton of FIG. 51;

[0120] FIG. 60 is a side elevation view of the carton of FIG. 51;

[0121] FIG. 61 is a sectional view of a portion of the food packaging device of FIG. 25;

[0122] FIG. 62 is a sectional view of a portion of a food storage device in accordance with the present invention;

[0123] FIG. 63 is a sectional view of the food storage device of FIG. 62;

[0124] FIG. 64 is a side elevation view, partly in section, a hood system in accordance with the present invention;

[0125] FIG. 65 is a perspective view of an automated seasoning device in accordance with one aspect of the invention;

[0126] FIG. 66 is a side elevation view of the seasoning device of FIG. 65;

[0127] FIG. 67 is a front elevation view of the seasoning device of FIG. 65;

[0128] FIG. 68 is a top plan view of the seasoning device of FIG. 65;

[0129] FIG. 69 is a diagrammatic view of a control system in accordance with the present invention;

[0130] FIG. 70 is a diagrammatic view of a control system in accordance with the present invention;

[0131] FIG. 71 is a diagrammatic view of a frying cycle in accordance with the present invention;

[0132] FIG. 72 is a schematic illustration of a sample touch screen monitor useful in accordance with the invention; and

[0133] FIG. 73 depicts another touch screen layout in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0134] General

[0135] In accordance with the present invention, an automated food processing system and method is provided. The automated food processing system and method in accordance with the invention allows food to be dispensed, fried and packaged in a suitable container or alternatively dispensed to a food holding area for subsequent processing by a human operator.

[0136] Referring to the Figures generally and in particular to FIGS. 1 and 3, there is illustrated an automated food processing system 100 in accordance with the invention. Automated food processing system 100 includes a food dispensing device 200, a fry device 400 and a food packaging device 600. In accordance with one embodiment of the present invention, each of dispensing, fry and packaging devices 200, 400 and 600, respectively, can be constructed and are sometimes illustrated in "modular" construction or form. By "modular" construction or form it is meant that dispensing, fry and packaging devices 200, 400 and 600, respectively, can exist and be contained in separate cabinets, for example, and also operate independently of the other devices. Thus, if one of dispensing, fry and packaging devices 200, 400 and 600, respectively, are inoperative or are otherwise deactivated, the function of the deactivated or inoperative device can be performed manually. For example, food to be fried could be manually dispensed in place of dispensing device 200. Alternatively, food to be fried could be fried in a conventional fry vat after being dispensed from dispensing device 200 in place of using fry device 400 and food that is dispensed and fried in dispensing and fry devices 200 and 400, respectively, could, in turn, be packaged manually, for example.

[0137] To facilitate such modular construction and use, each of dispensing, fry and packaging devices 200, 400 and 600, respectively, can be contained in a separate wheeled cabinet, 202, 402 and 602, respectively, as illustrated in FIG. 1. Alternatively, dispensing, fry and packaging devices 200, 400 and 600, respectively, could be mounted as a single unit or in a single cabinet or in "non-modular form," as desired, or more than one of such devices 200, 400 and 600 could be so mounted or combined.

[0138] A suitable control system for the dispensing, fry and packaging devices is also provided. As will be described more completely hereafter, in one embodiment, the control system includes a central control system 110 that can interface with a point-of-sale system 112. The central control system will communicate with separate subcontrol systems 114, 116 and 118, one for each of the dispensing, fry and

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packaging devices 200, 400 and 600, respectively. Alternatively, a single central control system (not shown) could be utilized in place of individual control systems for each of devices 200, 400 and 600. Similarly, as another alternative, a single central control system could be utilized to control the overall operation of automated food processing system 100 as well as controlling the individual functions and aspects of dispensing, fry and packaging devices 200, 400 and 600.

[0139] The basic operations of dispensing device 200, fry device 400 and food packaging device 600 will now be briefly discussed and discussed in detail hereafter.

[0140] Briefly, dispensing device 200 functions to dispense a quantity of food to be fried to fry device 400. In one aspect of the invention, any suitable food dispensing device can be utilized. Dispensing device 200 can include a cabinet 202 to house the components of dispensing device 200. In one embodiment, cabinet 202 will be refrigerated, preferably below 32° F so that the food contents therein will remain frozen. This allows the food stored in dispensing device 200 to remain therein for a long period of time, much longer than if the contents were merely refrigerated (above freezing) or merely at room temperature.

[0141] In the illustrated embodiment, dispensing device 200 includes an uncooked bulk food dispensing container 204. Uncooked bulk food dispensing container 204 may be utilized for food such as French fries or chicken nuggets, for example. Other types of food may also be contained in a dispenser such as uncooked bulk food dispensing container 204. Typically, those types of food would be in the form of relatively small pieces compared to relatively large food pieces such as chicken patties, for example.

[0142] For relatively large food pieces, a large food dispensing container is utilized. In one embodiment, the large food dispensing container is in the form of a magazine food dispenser 206.

[0143] Food dispensed from a dispenser of dispensing device 200 is deposited on a conveyor 208 that, in turn, directs the deposited food to a secondary or dump container 210 for subsequent discharge from dispensing device 200.

[0144] In the illustrated embodiment, uncooked bulk food dispensing container 204, magazine food dispenser 206, conveyor 208 and secondary container 210 are contained in cabinet 202, which is a refrigerated environment, preferably maintained below freezing (32° F or lower).

[0145] While any suitable conveyor can be utilized in one aspect, conveyor 208 is preferably a vibratory conveyor, vibrated by a suitable vibratory mechanism that vibrates a conveyor body 214. Conveyor body 214 may take the form of a suitably shaped tray, for example.

[0146] By containing the foregoing components in a refrigerated and preferably frozen environment, consistency in food preparation and dispensing is achieved, thereby contributing to the overall efficient, effective and uniform performance of automated food processing system 100.

[0147] Secondary container 210 can be of a form as desired and includes suitable weighing mechanism 216 to permit a determination of the quantity of food contained in secondary container 210. Weighing mechanism 216 can be any suitable device to weigh the contents or otherwise

determine the amount of food in secondary container 210. Weighing mechanism 216 may comprise a load cell or a mechanism for determining the volume of food deposited into secondary container 210, for example. In this manner, the amount of food that is charged to fry device 400 at a particular time can be determined. In addition, weighing mechanism 216 can be operated during operation of conveyor 208 and the operation of conveyor 208 continued until a desired amount of food is deposited in secondary container 210. In this manner, a precise amount of food can be delivered to secondary container 210 thereby permitting consistency and uniformity in the portion of food that is delivered to fry device 400. This is also important to ensure that a sufficient quantity of food is being cooked by automated food processing system 100.

[0148] Prior to activation of dumping mechanism 218, discharge door 220 of cabinet 202 is opened by operation of a door opening device which can be any suitable device as desired and in the illustrated embodiment is a cylinder 222 attached to discharge door 220 and moveable up and down in the direction of arrow B. Cabinet 202 is preferably insulated with a suitable insulating material 224 that is also provided in discharge door 220. The provision of a suitable insulating material is important, particularly since dispensing device 200 will typically be located proximate or adjacent fry device 400 that operates at a substantially elevated temperature, thereby typically generating substantial heat.

[0149] In the illustrated embodiment, dispensing device 200 includes four dispensing lanes from which food is discharged from dispensing device 200 and to a suitable location such as fry device 400. After dispensing through discharge door 220, cylinder 222 is activated to close discharge door 220. Similarly, dumping mechanism 218 of secondary container 210 is activated to return secondary container 210 to its upright position to receive more food.

[0150] Fry device 400 includes a fry wheel 404, a fry vat 406 for containing and heating a suitable cooking oil and a drive mechanism 408 for suitably rotating fry wheel 404. It is to be understood that in accordance with one aspect of the invention any suitable frying device can be utilized.

[0151] In the illustrated embodiment of FIGS. 3 and 11-16, fry device 400 includes a plurality, in this case four, of separate fry wheels 404, 410, 412 and 414, as well as four separate fry vats 416, 406, 420 and 418 and a separate drive mechanism 408 for each fry wheel, each dedicated to a particular one of fry wheels 404, 410, 412 and 414.

[0152] In one embodiment, a separate drive mechanism is provided for each of fry wheels 404, 410, 412 and 414 and can be suitably located in cabinet 402, preferably in a location that is above the level of cooking oil present in the associated one of fry vats 416, 406, 420 and 418, respectively.

[0153] The suitable rotation of each of fry wheels 404, 410, 412 and 414 can be as desired to direct food articles loaded therein down and through the fry vat until reaching the other side of the fry vat whereupon the food articles are discharged. The rotation can be either continuous or a periodic incremental rotation. For example, a suitable drive mechanism can be provided to periodically rotate fry wheel 410 in a desired rotational increment, which may be based on the number of compartments contained in fry wheel 410.

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In the illustrated embodiment of FIG. 13, for example, fry wheel 410 comprises eight food compartments 422, 424, 426, 428, 430, 432, 434, and 436. Each of food compartments 422-436 is a perimeter food compartment and open to the perimeter or exterior of fry wheel 410. Each of fry wheels 404, 412 and 414 can be similarly configured.

[0154] As described in more detail hereafter, each of compartments 422-436 is formed from a perforated curved compartment forming member 510.

[0155] In the rotation of fry wheel 410, a periodic incremental rotation can be based upon 360° divided by the number of compartments. Thus, for example, in the illustrated embodiment of FIG. 13, each periodic rotation would consist of a rotation of 360° divided by eight compartments or a periodic rotation increment of 45° . Thus, as illustrated in FIG. 13, the food contained, in this case French fries, in compartments 424-430 would remain in cooking oil 454 contained in fry vat 406 for all or part of four incremental rotations, after which the food would be discharged from fry wheel 410 in the next incremental rotation thereof. For example, as illustrated in FIG. 13, compartment 422 is ready to receive a charge of food to be fried, compartment 424 has a charge of food that has been just immersed in cooking oil 454. Cooking oil 454 is at a level H as illustrated in FIG. 13, which is dependent upon the amount of food contained in compartments 422-436 that are submerged in cooking oil 454.

[0156] Similarly, compartment 426 has food contained therein that has gone through two incremental 450 rotations of fry wheel 410, compartment 428 has food contained therein that has undergone three incremental rotations and food compartment 430 has food contained therein that has undergone four incremental rotations of fry wheel 410 and compartment 432, which is now empty, has discharged the food contained therein upon the last incremental rotation of fry wheel 410. Thus, upon the next incremental rotation of fry wheel 410, which is in the clockwise direction as shown by arrow B of FIG. 13, the food contained in food compartment 430, which in this case is a quantity of French fries 455, will be discharged from compartment 430 to the food packaging device which is hereafter briefly described.

[0157] Upon discharge of food, which in this case is a quantity of French fries from one of compartments 422-436 of a fry wheel, such as fry wheel 410 as illustrated in FIG. 3, the food is deposited onto an inlet chute 604 of food packaging device 600.

[0158] From inlet chute 604, the food from inlet chute 604 received from fry wheel 410 is deposited into rotatable food dispensing member 606. Typically, rotatable food dispensing member 606 will be compartmented into a plurality of compartments that are arrayed along the periphery of rotatable food dispensing member 606.

[0159] Rotatable food dispensing member 606 has a discharge location to discharge the food deposited therein. The discharge location is generally located towards an upper portion of rotatable food dispensing member 606. A food dispensing chute mechanism 608 is positioned to receive cooked food from the discharge location of rotatable food dispensing member 606. In a preferred embodiment, food dispensing chute mechanism 608 incorporates a device for weighing or otherwise determining the quantity of food that

has been deposited into food dispensing chute mechanism 608. This ensures that when food is dispensed from food dispensing chute mechanism 608 a minimum quantity of food will be dispensed, thereby ensuring that a container 611 or other package that is to receive the food from mechanism 608 will receive a desired charge.

[0160] Food packaging device 600 preferably also includes a suitable automated container handling system 610. Automated container handling system 610 is capable of, in a preferred embodiment, selecting container 611 of a desired size, retrieving and grasping container 611, erecting unerected container 611 into an erected form and holding the erected container 611 in position to receive food dispensed from food dispensing chute mechanism 608.

[0161] After food container 611 receives food from food dispensing chute mechanism 608, automated container handling system 610 is capable of moving container 611 having food deposited therein to a container receiving receptacle 612 which receptacle 612 can be transported via a conveyor system 614 to a desired location for subsequent pickup of container 611 having food contained therein by a human operator, for example.

[0162] Preferably, a food overflow collection member is provided to collect any food dispensed by food dispensing chute mechanism 608 that is not deposited into container 611. In one embodiment, the overflow food collection device is a rotatable food collection member 613. Overflow food collection member 613 functions to collect food dispensed by food dispensing chute mechanism 608 that is not received in container 611 and to recycle food collected by overflow food collection member 613 into food dispensing chute mechanism 608 for subsequent dispensing to a container in a first-in, first-out manner so that overflow food is promptly recycled to dispensing chute 608 for dispensing to a container.

[0163] Preferably, food packaging device 600 is configured to include a provision by which food contained in dispensing device 600 is routed to waste where it is not desired to dispense such food into a food container. Such a condition could arise, for example, if food is held for too long a period in food packaging device 600. This function may be accomplished, for example, by providing a waste discharge location which can be in the form of a waste chute 615 to which food from rotatable food dispensing member 606 and overflow food collection member 613 can be directed. In one embodiment, chute mechanism 608 is lowered and member 606 is rotated to dispense food to chute mechanism 608, which in turn dispenses into member 613. Member 613 is rotated counterclockwise to deliver food to waste chute 615. This process can be continued until all of the food in device 600 is so emptied, if desired.

[0164] Preferably, a suitable structure for applying a desired quantity of seasoning to food contained in food packaging device 600 is provided. In the embodiment illustrated in FIG. 3, a food seasoning device 616 is provided. Food seasoning device 616 can be any suitable seasoning device as desired. In one embodiment, food seasoning device 616 dispenses a desired quantity of seasoning from a bulk storage container through a delivery tube and onto food located in rotatable food dispensing member 606.

[0165] Preferably, and in the embodiment illustrated in FIG. 3, a food seasoning device 616 is provided that directs

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a desired quantity of seasoning onto food that is contained in a bottom portion of rotatable food dispensing member 606 and inlet chute 604 via a seasoning dispensing head 618.

[0166] Preferably, conveyor system 614 is composed of a raceway 620 that is an endless loop around the periphery of the top surface of cabinet 602 of food packaging device 600, which in one embodiment can be a modular, wheeled cabinet. Conveyor system 614 causes container receiving receptacle 612 to travel around raceway 620 to a food container pickup location 622 where a human operator can pickup food containers having food therein. Preferably, conveyor system 614 includes structure for stopping movement of a container/receiving receptacle 612 at a predetermined location when carrying a food container, such as at food container pickup location 622. Such structure in one embodiment may comprise a gate structure 928 or 928' of FIG. 45 and FIGS. 25-27, respectively, that extends across at least a portion of raceway 620 in the vicinity of the predetermined location. Any suitable type of barrier structure can be utilized to prevent the desired movement. Most preferably, gate structure 928 or 928' will be located at a height that is above the top of the receptacle when located on conveyor system 614 so that movement of container/receiving receptacle 612 is prevented or stopped only for a receptacle 612 that has a food container 611 disposed thereon. Note that the pickup location can be configured as desired and slightly different configurations 622 and 622' are shown in FIG. 45 and FIGS. 25-27, respectively.

[0167] Referring to FIG. 2, there is illustrated an alternate embodiment of an automated food processing system 101 in accordance with the invention. Automated food processing system 101 includes a food dispensing device 201 which is similar to food dispensing device 200, previously briefly described, where like reference numerals represent like elements. Food dispensing device 201 includes fewer uncooked bulk food dispensing containers 204 and additional magazine food dispensers that are similar to magazine food dispenser 206, previously referred to. Otherwise, dispensing device 201 is similar to dispensing device 200 previously described.

[0168] Automated food processing system 101 also includes fry device 400, which has been described.

[0169] One primary distinction between automated food processing system 100 and automated food processing system 101 is that automated food processing system 101 does not include an automated packaging device such as automated packaging device 600. In place of food packaging device 600, a food storage device 635 is provided. Food storage device 635 allows food cooked by food frying device 400 to be stored in a heated environment for subsequent manual processing. As configured in FIG. 2, food storage device 635 includes separate heated product receiving receptacles 637, 639, 641 and 643. Each receptacle 637, 639, 641 and 643 is dedicated to receiving food from a respective one of fry wheels 410, 412, 414 and 404, respectively. In addition, each receptacle 637-643 can have placed therein a suitable container to receive food, such as handled trays 645, 647, 649 and 651.

[0170] As illustrated in FIG. 2, a food item F is being discharged from fry wheel 414 down a chute 653 and into handled tray 649 contained within heated receptacle 641. Food item F can be stored therein for a period of time until it is ready for subsequent processing.

[0171] Food Dispensing Device

[0172] Referring to the Figures generally and in particular to FIGS. 1-10, there is illustrated various embodiments of food dispensing devices and portions thereof in accordance with the invention.

[0173] In one embodiment, food dispensing device 200 is illustrated or partially illustrated in FIGS. 1 and 3-8. Food dispensing device 200 includes a cabinet 202, bulk uncooked food dispensing containers 204, 205 and 207, magazine food dispenser 206, 209, 211 and 213, and a suitable conveyor system for each lane 234, 236, 238 and 240 of food dispensing device 200. Any suitable number of magazine dispensers can be used for a particular lane, such as one, two, three, four, five or more, and the illustrated embodiment of four is merely an example. As configured in FIG. 1, for example, lane 234 receives material from bulk hopper 204, lane 236 receives food material from bulk hopper 205, lane 238 receives food material from bulk hopper 207 and lane 240 receives dispensed food from magazine food dispensers 206, 209, 211 and 213 as will be described hereinafter in greater detail, particularly with respect to food dispensing device 201 of FIG. 2, for example.

[0174] Each lane 234, 236, 238 and 240 dispenses food that is subsequently directed to fry wheels 410, 412, 414 and 404, respectively.

[0175] The components of lane 238 will now be described in detail and it is to be understood that the components of lanes 234 and 236 are similar. Lane 238 includes uncooked bulk food dispensing container 207 and a food handling system 242 which in this embodiment is identical for each lane 234, 236, 238 and 240 as well as for each lane of food dispensing device 201. It should be noted that food handling system 242, as for example, illustrated in FIGS. 3-6 is depicted with respect to lane 240 and that food handling system 242 is the same for each lane 234, 236, 238 and 240.

[0176] Food handling system 242 includes conveyor system 208, secondary container 210, weighing mechanism 216 and dumping mechanism 218. Conveyor system 208 includes vibratory mechanism 212 and conveyor body 214.

[0177] Uncooked bulk food dispensing container 204 can be of a shape and dimension generally as desired. Preferably, uncooked bulk food dispensing container 204 has an upper opening to permit a supply of food to be placed in uncooked bulk food dispensing container 204. Upper opening 244 as illustrated is located in an upper rear portion of uncooked bulk food dispensing container 204 and can be conveniently accessed via a rear door 246 of cabinet 202. Rear door 246 preferably is insulated with suitable insulation material 224.

[0178] Uncooked bulk food dispensing container 204 is composed of a pair of opposed upper sidewalls 248, a pair of generally opposed lower sidewalls 250 and front and rear walls 252 and 254, respectively, which connect together upper sidewalls 248 and 250 to provide uncooked bulk food dispensing container 204. Front sidewall 252 includes a lower portion 252' that extends inwardly from top to bottom to further facilitate discharge of food contained in uncooked bulk food dispensing container 204. Preferably, lower generally opposed sidewalls 250 are slightly indented from top to bottom to facilitate the discharge of food that may be contained therein.

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[0179] Uncooked bulk food dispensing container 204 includes a bottom opening 256 that permits the discharge of food contained therein. Bottom opening 256 can be configured as desired and in the illustrated embodiment the entire bottom of uncooked bulk food dispensing container 204 is open. In the illustrated embodiment, uncooked bulk food dispensing container 204 is particularly suited for use with food such as French fries and chicken nuggets as well as other types of food of relatively small size.

[0180] Uncooked bulk food dispensing container 204 is suitably mounted within cabinet 202. While a suitable mounting structure can be utilized, it is preferred to utilize a structure that will minimize heat transfer from the exterior and through cabinet 202 to uncooked bulk food dispensing container 204, particularly where cabinet 202 is refrigerated, especially where temperatures below freezing are utilized. In that regard, front mounting bracket 258 and rear mounting bracket 260 each are configured to minimize heat transfer from cabinet 202 to uncooked bulk food dispensing container 204. In that regard, front mounting bracket 258 and rear mounting bracket 260 include openings, 258' and 260', respectively, to minimize such heat transfer and to maximize airflow around the containers 204, 205, 207 and dispensers 206, 209, 211 and 213. Similarly, materials of low thermal conductivity can also be utilized, if desired, for brackets 258 and 260. Generally, to minimize heat transfer and to maximize airflow, the surface area contact and cross-sectional area of mounting brackets 258 and 260 should be minimized to reduce heat transfer and "hot spots" on uncooked bulk food dispensing container 204.

[0181] As illustrated in FIGS. 3 and 4, for example, food contained in uncooked bulk food dispensing container 204 passes through bottom opening 256 and onto conveyor body 214 which in the illustrated embodiment is a suitably dimensioned pan. Conveyor body 214 is suitably mounted to vibratory mechanism 212 to effect vibration of conveyor body 214 as well as food contained therein and food contained in uncooked bulk food dispensing container 204, and in particular the lower portion of container 204. This vibration facilitates the discharge of food from uncooked bulk food dispensing container 204 and causes food contained in conveyor body 214 to travel in the direction of arrow G. Any suitable conveyor system can be used in accordance with one aspect of the invention.

[0182] A preferred type of vibratory mechanism is available from FMC Technologies, Inc. of Chicago, Ill. marketed under the model F-010-B and DF-010-B. Vibratory mechanism 212 is preferably an electromagnetic vibrating mechanism. Vibratory mechanism 212 in one embodiment produces a vibrating stroke at the surface of conveyor body 214. The stroke results from the action of an electromagnet that pulls conveyor body 214 sharply down and backward and then allows it to spring up and forward. Typical vibratory mechanisms of this type run at about 3,600 vibrations/minute at 60 Hz power. The power of the vibrating stroke can be controlled by a suitable drive module as is known in the art. In one embodiment, vibratory mechanism 212 can be operated at about 85% of full power during filling of secondary container 210 with food. For the first part of a fill cycle of secondary container 210, vibratory mechanism 212 can be run continuously, then pulsed by turning its power on and off periodically so that vibratory mechanism 212 operates about 50% of the time to finish filling secondary

container 210 with a desired quantity of food, thereby providing better control on the last part of the food charged to secondary container 210.

[0183] Food dispensing device 200 preferably includes a suitable mechanism to determine the weight or volume of a charge of food delivered by conveyor system 208 to secondary container 210. The amount may be determined either by weight or volume, for example. In the illustrated embodiment, weighing mechanism 216 is operatively interfaced with secondary container 210 to provide an indication of the weight of food contained in secondary container 210. The weight sensed in secondary container 210 by weighing mechanism 216 is communicated with control system 114 of food dispensing device 200. Control system 114 monitors and controls the operative functions of food dispensing device 200 as hereinafter described in greater detail.

[0184] Optionally, a level sensor can be employed in uncooked bulk food dispensing container 204 to provide an indication of the amount of food stored therein that is available for dispensing. Any suitable level indicator known in the art can be utilized in accordance with the invention such as photoelectric, weight, turning fork and others, for example.

[0185] Secondary container 210 can be considered as a dump container and as associated therewith, dumping mechanism 218 for rotating secondary container 210 through an arc as indicated by arrow B sufficiently to dump the contents of secondary container 210. Any suitable dumping mechanism can be utilized. Illustrated dumping mechanism 218 includes a dump cylinder 264 that is secured to a base 266. Dump cylinder 264 can selectively rotate a drive gear or wheel 268 that, in turn, is operatively associated with a follower gear or wheel 270 to cause rotation of follower gear or wheel 270. Secondary container 210 is rigidly secured to follower gear or wheel 270 so that when follower gear or wheel 270 is rotated by drive gear or wheel 268 secondary container 210 is rotated through an arc that causes secondary container 210 to rotate forward to a dumping position as illustrated in phantom lines in FIG. 3 indicated by reference numeral 210'. Such movement is caused by extension of dump cylinder 264. Similarly, retraction of dump cylinder 264 moves secondary container 210 from the dump position indicated by reference numeral 210' to the upright position indicated by reference numeral 210 in FIG. 3 where secondary container 210 is ready to receive a charge of food from conveyor system 208, which in the illustrated embodiment the food is French fries FF.

[0186] An alternative embodiment for secondary container 210 is illustrated in FIG. 4A. Secondary container 210' is composed of a pair of opposed spaced apart sidewalls 211 (only one sidewall 211 is illustrated and is depicted in a half-moon configuration) and a pair of sidewalls 213a and 213b, oriented in a V-shaped relationship when container 210' is configured to receive food from conveyor body 214. Sidewall 213a is mounted for pivotal movement about apex 215 of sidewalls 213a and 213b. Such movement is accomplished by a drive mechanism similar to cylinder 264, drive gear 268 and driven gear 270, which in this embodiment are cylinder 264', drive gear 268' and driven gear 270', which gear 270' is attached to sidewall 213a. When cylinder 264' is extended, sidewall 213a is caused to pivot downwardly as indicated by arrow AA to the position of sidewall 213a

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shown in phantom, thereby causing the contents (French fries FF) of container 210 to be dumped. Sidewalls 211 act as sidewall guides for sidewalls 213a and 213b when sidewall 213a is in a lowered position, in which case sidewalls 213a and 213b act as a chute or slide.

[0187] Control system 262 coordinates the operation of the various functions of food dispensing device 200. For example, when food dispensing device 200 is ready to dump a charge of food from secondary container 210 out of food dispensing device 200, control system 262 activates cylinder 222 to open discharge door 220 thereby permitting the food charge in secondary container 210 to be dumped by dumping mechanism 218 through open discharge door 220. After dumping of the food charge is completed, control system 114 causes dump cylinder 264 to be retracted thereby returning secondary container 210 to a position ready to accept a further charge of food from conveyor system 208. Cylinder 222 has one end rigidly secured to cabinet 202 or some other suitable location and the other end of cylinder 222 is attached to discharge door 220. Typically, discharge door 220 will have a suitable guide mechanism, which may be tracks, slots or other suitable apparatus to guide discharge door 220 to its open and closed positions. Cylinder 222 is operable to move door 220 up and down as indicated by arrow B in FIG. 6 to thereby open and close discharge door 220 as desired. In the illustrated embodiment, discharge door 220 extends across all four dispensing lanes 226, 228, 230 and 232. If desired, a separate discharge door could be provided for each of dispensing lanes 226, 228, 230 and 232. In addition, control system 262 causes activation of cylinder 222 to close discharge door 220 to prevent heat from entering into cavity 272 of food dispensing device 200 in which the food and various dispensing mechanisms are contained as illustrated in FIGS. 3 and 6, for example.

[0188] Food dispensing device 200 can contain suitable refrigeration components 274 such as within a lower portion of cabinet 202 as shown schematically in FIG. 1. In accordance with the preferred embodiment of food dispensing device 200, refrigeration components 274 provide sufficient cooling to provide a below freezing temperature environment in cavity 272. Alternatively, suitable refrigeration components can be provided exteriorly of cabinet 202 and even at a remote location as desired. In addition, a storage compartment 276 and a storage compartment door 278 may also be provided in cabinet 202. An upper side access door may also be provided to permit operator access to the interior of cavity 272 where uncooked bulk food dispensing containers 204 and/or magazine food dispensers 206 and/or 209, 211 and 213 are located.

[0189] Referring to FIGS. 2 and 7-10, there is illustrated another embodiment of food dispensing device 201 in accordance with the present invention.

[0190] Food dispensing device 201 has many similarities to food dispensing device 200 previously described where like reference numerals represent like elements. Thus, food dispensing device 201 includes cabinet 202, four product dispensing lanes 226, 228, 230 and 232 with each such lane incorporating conveyor system 208, secondary container 210, vibratory mechanism 212, conveyor body 214, weighing mechanism 216, dumping mechanism 218, discharge door 220, cylinder 222, insulating material 224, food handling system 242, upper opening 244, rear door 246,

uncooked bulk food dispensing container 204 which is associated with product dispensing lane 234, a dump cylinder 264 for each product dispensing lane, cavity 272, refrigeration components 274, storage compartment 276 and a storage compartment door 278. Product dispensing lanes 228, 230 and 232 each have associated therewith a plurality of magazine food dispensers 280-308 arrayed to provide in the embodiment illustrated in FIG. 9 five magazine food dispensers per product dispensing lane in which there are three product dispensing lanes serviced by the foregoing magazine food dispensers. Consequently, magazine food dispensers are configured in a three-by-five array and are suspended from a magazine food dispenser support 310 as shown in FIG. 9. Each row of three magazine food dispensers depends from magazine food dispenser support 310 via a slide assembly 312. Slide assembly 312 is similar to a drawer slide including a pair of first and second elongated telescoping left and right slides 314 and 316, respectively. Suitable upper rollers 318 are mounted to magazine food dispenser support 310 and lower rollers 320 depend from magazine food dispensers 280-308 for traversing left and right elongated telescoping slides 314 and 316.

[0191] Suitable mounting brackets 322 are provided which depend upwardly from magazine food dispenser support 310 for mounting to cabinet 202.

[0192] In addition, suitable mounting brackets 324 are provided which depend downwardly from magazine food dispenser support 310 for mounting slide assembly 312 thereto allowing magazine food dispensers 280-308 to depend therefrom.

[0193] Magazine food dispenser support 310 has a series of holes 326 and 328 therein. Holes 326 can be provided to allow increased airflow and cooling. Holes 328 can also be provided to provide increased airflow and cooling for magazine food dispensers 280-308.

[0194] Each of magazine food dispensers 280-308 and 206, 209, 211 and 213 briefly discussed with respect to food dispensing device 200 are similar in construction. Magazine food dispenser 206 will be discussed with respect to FIGS. 7 and 8 and it is to be understood that the other magazine food dispensers are of similar construction.

[0195] Magazine food dispenser 206 includes a body or housing 330 that includes sidewalls 332 and 334, front walls 336 and 338 and corresponding rear walls (not shown) and can be attached in a removable manner if desired, including in a snap-on arrangement to facilitate cleaning. Magazine food dispenser 206 also includes a top member or cover 340 having mounted thereover a drive mechanism 342. Drive mechanism 342 includes a drive gear or wheel 344 and a driven wheel or gear 346. Depending from each of drive wheel or gear 344 and driven wheel or gear 346 is a spiral flight that is vertically or generally vertically oriented relative to the longitudinal axis of spiral flights 348 and 350. If desired, a single spiral flight dispenser (not shown) could also be utilized.

[0196] Body 330 of magazine food dispenser 206 can include substantial open portions such as front open portion 352 and a corresponding rear open portion (not shown). Such open portions may have a cover or access door thereover (not shown). Such open portions can be desirable to permit airflow through magazine food dispenser 206 since

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generally such dispenser will be contained in a refrigerated environment and such openings help ensure that food contained therein remains frozen or chilled as desired. A vertical divider (not shown) can be provided between spiral flights 348 and 350 if desired.

[0197] A plurality of generally vertically disposed and spaced apart rods 354, 356 and 358 may be provided at the front of magazine food dispenser 206 adjacent spiral flights 348 and 350 and similar rods can be provided at the back of magazine food dispenser 206. Rods 354, 356 and 358 prevent food pieces from falling out of spiral flights 348 and 350 and to maintain spiral flights 348 and 350 in a vertical orientation.

[0198] Magazine food dispenser 206 has an open bottom 360 through which food pieces can be dispensed during operation.

[0199] During operation, drive wheel 344 can be driven by a suitable electric motor, such as an electric motor 362, 364 and 366 shown with respect to magazine food dispensers 280, 282 and 284 in FIG. 9. Alternatively, other drive devices could be used, including, for example, a rotary air or hydraulic cylinder. Rotation of drive wheel 344 in a clockwise direction causes driven wheel 346 to rotate in a counterclockwise direction by virtue of the intermeshing or contact between drive wheel or gear 344 and driven wheel or gear 346. Such rotation causes corresponding rotation of spiral flights 348 and 350, respectively. Food contained by spiral flights 348 and/or 350 is moved downwardly by virtue of such rotation. When such food reaches the bottom of spiral flights 348 and/or 350, respectively, such food is discharged from magazine food dispenser 206 through open bottom 360 and onto conveyor system 208 for handling as previously described. A single motor could be used to drive a plurality of dispensers 280, 282 and 284, etc. through a suitable drive mechanism (not shown).

[0200] As shown in FIG. 8, pieces of food can be contained by magazine food dispenser 206 in two different ways. For example, individual pieces of food may each be contained by a single elongated spiral flight 348 or 350 as shown with respect to food pieces F1 and F2, respectively. Food pieces F1 and F2 can be any type of desired food and may be a food item such as a hash brown, an individual portion pie, rectangular food patty, or other type of food as desired. Chicken nuggets and other food can also be dispensed with the bulk dispenser previously described. Larger items of food can span across portions of both elongated spiral flights 348 and 350 as illustrated with respect to food item F3, which may be a larger food item, such as a chicken patty, or other type of food article as desired. Spiral flights 348 and 350 can be of a desired radial diameter so that the food piece or pieces that are to be contained and dispensed in magazine food dispenser 206 can be accommodated as illustrated in FIG. 8. Each spiral can contain a food piece so that as illustrated in FIG. 7, the illustrated spirals of spiral flights 348 and 350 could each accommodate twelve food pieces such as food pieces F1 or F2 for a total of twenty-four food pieces or twelve food pieces such as food piece F3 of FIG. 8. As will be appreciated, spiral flights having a greater or lesser number of flights can be used if desired to hold a greater or lesser number of food pieces, respectively.

[0201] A suitable home position sensor 362' can be utilized to indicate a home or start position of each of spiral

flights 348 and 350. As illustrated in FIG. 7, a pair of position indicating sensors 362' and 364' are utilized and mounted on drive wheel 344 180° apart for more precise locating of the position of spiral flights 348 and 350. Sensors 362' and 364' can be proximity sensors that align with corresponding sensor pickups on the respective drive gear or motor for magazine food dispenser 206 (not shown).

[0202] Preferably, spiral flights 348 and 350 are offset by one rotation so that a single food item such as food item F1 or F2 in FIG. 8 will be dispensed from one of either spiral flight 348 or 350 for each one-half rotation of spiral flights 348 and 350.

[0203] Preferably, food dispensing device 200 and food dispensing device 201 are constructed in modular form, an example of which is illustrated in FIGS. 1 and 2, respectively. Wheels 368 are provided to permit cabinets 202, 402 and 602 to be suitably transported across a relatively flat surface, such as a restaurant work area floor.

[0204] Food Frying Device

[0205] Referring to the Figures generally, and in particular to FIGS. 1-2 and 11-24, there is illustrated fry device 400 and various components and alternative components thereof in accordance with the invention.

[0206] In one embodiment, fry device 400 includes cabinet 402, four fry wheels 404, 410, 412 and 414, four fry vats 406, 416, 418 and 420, four drive mechanisms 408, one for each of fry wheels 404, 410, 412 and 414. Each fry vat 406, 416, 418 and 420 is dimensioned to contain a desired volume of a suitable cooking oil. Each fry vat 406, 416, 418 and 420 is dedicated to one of fry wheels 404, 410, 412 and 414, respectively.

[0207] In operation in the preferred embodiment, fry device 400 is positioned to receive the food dispensed from a food dispensing device, such as food dispensing device 200 and food dispensing device 201. Consequently, it is advantageous to position fry device 400 adjacent food dispensing device 200 or 201 as illustrated in FIGS. 1 and 2, respectively. A suitable control panel 456 can be provided and located in a suitable location, such as on the side of cabinet 402. In the illustrated embodiment, control panel 456 contains a separate display for each of fry wheels 404, 410, 412 and 414 referred to by reference numerals 456a-d, respectively. Control panels and displays 456a-d can include information such as set cycle time, oil temperature, oil level as well as controls to adjust cycle time and oil temperature, for example.

[0208] Referring to FIG. 13, there is illustrated fry wheel 410. Fry wheel 410 includes two opposed circular spaced apart circular disks 458a and 458b. Disks 458a and 458b can include a plurality of apertures 460 as desired to reduce wheel weight and to provide circulation of cooking oil and to permit passage of water vapor therethrough, such as during frying food products, for example. A fry wheel axle 462 is provided to which disks 458a and 458b are mounted. Axle 462 is suitably mounted, typically and preferably for rotation with respect to fry vat 406 at a location above the normal level of cooking oil or range of levels of cooking oil that will be encountered in fry vat 406 during operation.

[0209] In one embodiment, outer peripheral edge 464 of each of disks 458a and 458b include a plurality of teeth 466.

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[0210] Teeth 466 can be utilized to drive fry wheel 410 in a manner as hereinafter described. Referring to FIGS. 14-16, there is illustrated in sectional view of disk 458a of fry wheel 410, a portion of which is located within fry vat 406. A drive wheel 468 is associated in operative position relative to teeth 466 located on outer peripheral edge 464 of disk 458a. Drive wheel 468 can be formed from a disk of material of a suitable thickness having a circumferential groove 470 therein. Circumferential groove 470 is typically at least or slightly greater than the thickness of disk 458a in the area where drive wheel 468 and disk 458a are juxtaposed as illustrated in FIGS. 14 and 15. A series of spaced apart pins 472 extend across circumferential groove 470 and are radially arrayed and spaced from the center of drive wheel 468. Drive wheel 468 includes a central aperture 474 through which a drive axle 476 can be mounted. In operation, drive wheel 468 is rotated by drive axle 476 with drive wheel 468 being positioned a fixed distance from disk 458a so that pins 472 mesh with teeth 466 when rotated as illustrated in FIG. 14 thereby causing rotation of disk 458a and consequently fry wheel 410 in a direction of rotation opposite to the rotation of drive wheel 468, as indicated by arrows K and L of FIG. 14.

[0211] It is to be understood that any suitable drive wheel and drive arrangement can be utilized. For example, in place of drive wheel 468 with pins 472, a drive arrangement could be utilized in which a drive gear is utilized to mesh with a corresponding gear located around the periphery of disk 458a and/or 458b, for example. Alternatively, a friction drive system could be utilized in which a friction drive wheel would contact the edge of one or both of circular disks 458 which could be of a design having no teeth therealong, such as illustrated in alternative embodiment wheels 479 and 481 described hereafter. Since the wheel will have cooking oil thereon, the coefficient of friction between the drive wheel and fry wheel will be decreased. Care should be taken to assure that when using a friction drive, sufficient pressure is maintained between the driving wheel and the fry wheel.

[0212] Referring to FIG. 16, there is illustrated a drive mechanism for driving drive wheel 468. The drive mechanism includes an electric motor 478, a gear reduction drive 480, an output shaft 482, a drive pulley wheel 484, a driven pulley wheel 486 and a drive belt 488 extending around drive pulley wheel 484 and driven pulley wheel 486 to drive axle 476 which thereby drives drive wheel 468 since the end 476a of axle 476 is fixed in aperture 474 with respect to drive wheel 468. A shear pin 490 can be located in a shear pin aperture 492 of drive wheel 468 to retain axle 476 in a fixed position relative to drive wheel 468. Axle 476 is suitably contained within an axle journal 494 which, in turn, is mounted to frame 496 to permit movement of axle 476 relative to axle journal 494 and frame 496. Similarly, motor 478 and gear reduction drive 480 are suitably mounted to frame 496. If desired, motor 478 may be a stepper motor.

[0213] Typically, it is important that the fry wheel is rotated in periodic increments for a compartment to be aligned with a respective discharge slide 498 of fry device 400 or other slide, ramp or discharge location after a periodic rotation. Typically, the leading edge 500 of a compartment bottom, such as compartment bottom 432' of compartment 432 as shown in FIG. 13 is aligned with the upper edge of fry vat 406 or the top edge of discharge chute 498 associated therewith to allow the contents of compartment 432 to be

discharged therefrom. As illustrated in FIG. 13, the contents of compartment 432 have already been discharged from fry wheel 410. This is particularly important where incremental rotation of fry wheel 410 is utilized as opposed to a continuously moving fry wheel. Thus, for incremental rotation it is desirable for bottom edge 500 of compartment 432 to be aligned with discharge 498 or the upper edge 406' of fry vat 406. In order to accomplish this, a stepper motor can be utilized to drive fry wheel 410. Alternatively, or in addition, the position of the baskets can be sensed and their position adjusted accordingly to assure that all baskets are in the correct position for loading and discharge during operation. Also, utilizing location sensors allows use of a simple DC or AC motor, as opposed to a stepper or servo motor. Any suitable sensor can be utilized in conjunction with a control system to control operation of the fry wheel drive motor. Suitable sensors include proximity, magnetic reed, Hall Effect, photoelectric and capacitive sensors. Such sensors are well known in the art and consequently a detailed description of those sensors is not included herein.

[0214] In accordance with another aspect of the invention, it should be understood that the height of cooking oil in one of fry vats 406, 416, 418 and 420, such as the level of cooking oil indicated by reference letter H in FIG. 13 in fry vat 406 will increase or decrease depending upon the amount of food that is submerged underneath the surface of cooking oil contained in fry vat 406. Thus, as illustrated in FIG. 13, compartments 424, 426, 428 and 430 each have a charge of food, in this case French fries 455 contained therein. Each compartment contains approximately one pound of French fries that are beneath the surface level H of cooking oil contained in fry vat 406. This quantity of submerged food raises the level H of cooking oil in fry vat 406. This increase in the level of cooking oil can cause the food to be submerged and therefore cooked for a longer of period of time in the cooking oil. For example, contrast the level of cooking oil depicted in FIG. 13 with the level of cooking oil depicted in FIG. 20 in which a charge of French fries 455 is contained only within compartment 426. This results in a substantially reduced level of cooking oil H' as indicated in FIG. 20. Thus, the control system for fry device 400 can be adjusted to take into account for different levels of cooking oil which can be sensed by a suitable sensor as is known by those skilled in the art (not shown). Where rotation of fry wheel 410 is done incrementally after a period of time elapses, the period between incremental rotations can be increased or decreased as desired based on the level of cooking oil present in fry vat 406. For example, in the situation illustrated in FIG. 13, the duration between incremental rotation of fry wheel 410 could be decreased compared to the situation depicted in FIG. 20 where the level H' of cooking oil is significantly lower than the level H of cooking oil in FIG. 13. This assumes that the temperature of cooking oil in each of the situations depicted in FIGS. 13 and 20 is substantially the same. Similarly, if a constant rotation fry wheel operation is utilized, such as where fry wheel 410 would rotate constantly, the rotational speed could be increased to handle the situation depicted in FIG. 13 compared to the speed of the wheel that would be utilized for the situation in FIG. 20, where the level H' of cooking oil in FIG. 20 is significantly less than the level H of cooking oil in FIG. 13.

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[0215] Referring to FIGS. 13 and 20, frying device 400 can also include a fry wheel follower "or fry wheel liner" 502 which is supported by a fry wheel follower support 504. Fry wheel follower 502 is a curved perforated circular segment having a width approximately equal to the width of fry wheel 410. Fry wheel follower 502 is supported by a pair of fry wheel follower supports 504 that are spaced apart and connected by lateral supports 506. Fry wheel follower 502 prevents food pieces that are larger than the perforations in fry wheel follower 502 from falling from fry wheel compartments 422-436 during operation. Preferably, the perforations in fry wheel follower 502 are composed of circular holes having a diameter of about 0.187 inches that are in staggered rows having a center-to-center hole distance of about 0.312 inches. Fry vat 406 includes a suitable heating element 505, illustrated in FIGS. 13, 20 and 21.

[0216] Referring to FIGS. 17-19 there is illustrated a curved compartment forming member 438 which is composed of two opposed sidewalls 508a and 508b that are interconnected by a curved J-shaped member 510 that forms compartment bottom 510a and compartment top 510b. Preferably, a wiper 512 is suitably mounted to compartment member 510.

[0217] A plurality of compartment forming members 438 are mounted together in fry wheel 410 to provide a plurality of adjacent peripheral food compartments 422-436 as illustrated in FIG. 13. As illustrated in FIG. 13, the top of one J-shaped member 510 abuts the bottom of adjacent J-shaped member 510. Thus, advantageously, a fastening member 514, which can be a rivet, for example, that secures wiper 512 to compartment bottom 510a of one curved J-shaped member 510 will also pass through the compartment top 510b of the adjacent curved J-shaped member 510. Preferably, wiper 512 has a plurality of transversely extending grooves 516a-f that permit drainage of cooking oil there-through as wiper 512 exits the cooking oil in fry vat 406, for example.

[0218] Referring to FIG. 17, opposed sidewalls 508a,b and curved J-shaped member 510 are perforated to permit the flow of cooking oil therethrough thereby promoting good heat transfer between the cooking oil contained in fry vat 406 and food contained in one of compartments 422-436 when immersed in cooking oil. A suitable hole size is about 0.156 inches spaced center-to-center about 0.250 inches. Wiper 512 also ensures that close contact is maintained between the interface of fry wheel follower 502 and the top and bottom ends of each food compartment 422-436 which in each case will be bounded by one of wipers 512. Any suitable material can be used for wiper 512 such as rubber or Teflon, for example.

[0219] As an alternative construction, compartments 422-436 could be constructed from curved J-shaped members 510 without opposed sidewalls 508a and 508b, in which case the compartment sidewalls could be formed from opposed circular disks 458a and 458b. In addition, it should be appreciated by one skilled in the art that any desired compartment shape can be utilized in accordance with the invention as long as the food can be loaded into the compartment, kept within the compartment during immersion in the cooking oil and which compartment shape discharges the food from the fry wheel.

[0220] Referring to FIGS. 21 and 22, there are illustrated further aspects of fry device 400. FIG. 21 is a sectional view

along line 21-21 of FIG. 20. FIG. 21 illustrates the elements previously described and in addition shows the interface of adjacent fry vats 406 and 420 and in enlarged form in FIG. 22. Disposed between fry vats 406 and 420 is a banking strip 518 that bridges the gap between fry vats 406 and 420. Banking strip 518 can be in a shape as desired and in the illustrated embodiment is a generally inverted V-shaped strip that spans the gap between fry vats 406 and 420. Banking strip 518 prevents any material that is discharged between fry wheels 410 and 412 from falling between fry vats 406 and 420 and causing such material to fall into one of fry vats 406 and 420.

[0221] Referring to FIGS. 23 and 24, there are illustrated alternate embodiments of a fry wheel for use in accordance with the invention. It is to be understood that the fry wheel is capable of numerous changes and rearrangements, and the fry wheel, as well as other components and embodiments of the present invention, is not intended to be limited to the specific embodiments described herein.

[0222] Referring to FIGS. 23 and 24, there are illustrated wire form wheels 479 and 481. Each of wheels 479 and 481 has a rim 520 and 522, respectively, constructed of tubing, which can be smooth tubing. Such a wheel could be driven by a friction wheel, if desired. In each of wheels 479 and 481 a plurality of individual tubular spokes 524 extend from each rim to a corresponding hub assembly 526. An axle 528 connects hubs 526 together in each of wheels 479 and 481. Wheel 479 includes a slotted member 530 that bridges each pair of spokes 524. Each slotted member 530 includes a centrally disposed slot 532 and a pair of tabs 534 on either side of slot 532. A plurality of fry baskets 536, one for each slotted member 530 or pair of spokes 524 is mounted in a snap-lock relationship to each slotted member 530. Fry baskets 536 have perforated sides and a perforated bottom and top and can be of a similar configuration as previously described with respect to fry wheel 410. Each basket 536 can have a spring tab member 538 that interlocks with slotted member 530 to secure fry basket 536 to fry wheel 479 resulting in a finished fry wheel 481 as shown in FIG. 24. It is to be understood that the embodiment illustrated in FIGS. 23 and 24 is not limited to snap-in baskets and that other baskets can be used with the wheel arrangement depicted in FIG. 23 with or without slotted members 530. For example, baskets could be welded or otherwise affixed to rim 520 and spokes 524. Each of fry baskets 536 includes perforations 540 on the sides, top and bottom thereof, such as previously described with respect to compartment forming member 438.

[0223] Referring to FIG. 24, there is illustrated an alternative drive mechanism 535 to rotate fry wheel 481. Drive mechanism 535 includes a motor 537, a shaft 539 and drive rollers 541 and structure for supplying a force in the direction of arrow FW. Drive rollers 541 are mounted on shaft 539 which can be rotated by motor 537 to cause rollers 541, each aligned with one of rims 522, to rotate, thereby rotating fry wheel 481. A force FW is supplied in the direction of arrow FW to ensure that rollers 541 impart a sufficient tractive force to cause rotation of fry wheel 481. Force FW can be supplied by any suitable structure, including a spring, a weight or an electromagnet, for example. For example, motor 537, shaft 539 and rollers 541 could be mounted on a platform (not shown) that is moveable in the direction of arrow FW and a force could be applied to urge platform in

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the direction of arrow FW to ensure proper traction of rollers 541. Rollers 541 may be constructed of any suitable material, including rubber, for example. Motor 537 can be controlled by fry control 116, for example.

[0224] Fry wheel 410 can be rotated as desired so that food deposited in one of compartments 422-436 travels through and out of the cooking oil 454 until that compartment reaches a discharge location. Thus, in the embodiment illustrated in FIGS. 13 and 20, the rotation is in a clockwise direction as indicated by arrow K in FIG. 13 and arrow K in FIG. 20. The rotation of fry wheel 410 can be either continuous or periodic. In a periodic rotation, the rotation will typically be incremental, that is, the wheel is rotated to some degree and then stops. Thereafter, after a set period of time, the wheel undergoes another periodic rotation. This process continues as each fry basket is rotated through and out of the cooking oil vat and to the discharge location. Preferably, each periodic rotation consists of a rotation of 360° divided by the number of compartments present in the fry wheel or some fraction of that periodic rotation increment so that the position of the wheel can be known without the use of sensors. However, the use of a sensor or sensors to be able to monitor wheel position can also be used either as the primary way of controlling wheel position or as a backup. Also, use of a sensor to determine wheel position allows use of a standard AC or DC motor. Suitable control of wheel 410 can be accomplished by fry control 116, for example.

[0225] In accordance with the present invention, a basket shaking simulation can be achieved. Basket shaking simulation can be performed by a relatively slight back and forth rotation of the fry wheel, such as fry wheel 410. Thus, the drive mechanism is activated to rotate the fry wheel clockwise and counterclockwise through a relatively small degree of angular rotation to simulate shaking of a fry basket during frying. The back and forth rotation can occur relatively rapidly and typically the degree of angular rotation will be in the range of from about 2 to about 20 degrees. In addition, the periodic rotation in one direction may be of a larger angle of rotation than the rotation in the other direction.

[0226] Preferably, the degree of rotation during simulated basket shaking will be monitored, particularly where the rotation in one direction is greater than the rotation in the other direction so that the position of each basket relative to the discharge location can be monitored by the control system to ensure proper discharge of food from food compartments.

[0227] Referring to FIG. 64, there is illustrated in partially schematic view fry device 400 along with portions of food dispensing device 200 and food packaging device 600. As illustrated in FIG. 64 a hood system 546 is provided. Hood system 538 includes a hood structure 548, a filter 542 and a drip pan 544.

[0228] A suitable air blower (not shown) can be provided to cause air flow to move within hood system 538 generally in the direction of arrows A1, A2 and A3. Filter 542 thus filters particulate matter in air flow A1 that passes through filter 542. Drip pan 544 catches any matter that drips from filter 542 that is located above drip pan 544. Preferably, hood system 538 substantially completely encloses the area above fry device 400 to reduce waste discharge into the operating environment of automated food processing system 100.

[0229] Food Packaging Device

[0230] Referring to the Figures generally, and in particular to FIGS. 1 and 25-50, there is illustrated various embodiments of food packaging devices and elements thereof in accordance with the invention.

[0231] In one embodiment, food packaging device 600 is illustrated or partially illustrated and elements useful in connection with food packaging device 600 are illustrated in FIGS. 1 and 25-50. Food packaging device 600 includes a cabinet 602 having a countertop surface 636. Food packaging device 600 can be advantageously constructed in modular form so that it can be operated together with previously described food dispensing device 200 and fry device 400 and alternatively operated separately from both or either of those devices.

[0232] Food packaging device 600 in the illustrated embodiment includes a food inlet chute 604, rotatable food dispensing member 606, food dispensing chute mechanism 608, automated container handling system 610, container-receiving receptacle 612, overflow food collection member 613, conveyor system 614, waste chute 615, food seasoning system 616 and raceway 620.

[0233] In the illustrated embodiment, food packaging device 600 includes a container storage device for containing cartons or containers of various sizes. During operation of packaging device 600, the device selects a container of a desired size from container storage magazine 638, erects the container into an erected form that is unerected while contained in storage magazine 638 and then positions the erected container to receive food dispensed from food dispensing chute mechanism 608. After receiving food from food dispensing chute mechanism 608, automated container handling device 610 is capable of moving the filled or partially filled container to container receiving receptacle 612 which is transported via conveyor system 614 to a desired location for subsequent pickup of the container by a human operator, for example.

[0234] In the embodiment illustrated in FIGS. 25-29, food packaging device 600 includes food overflow collection member 613 to collect food dispensed by food dispensing chute mechanism 608 that is not deposited into a container. In the illustrated embodiment, overflow food collection device 613 is a rotatable wheel as hereinafter described in detail. Overflow food collection member 613 functions to collect food dispensed by food dispensing chute mechanism 608 that is not received in a container and to recycle that food into food dispensing chute mechanism 608 for subsequent dispensing to a container. This permits food dispensed by food dispensing chute mechanism 608 but not deposited in a container to be promptly recycled to the dispensing chute in a first-in, first-out manner, so that overflow food is promptly recycled and dispensed to a container.

[0235] Referring to FIGS. 26-28, there is illustrated food packaging device 600 in which inlet chute 604 is positioned to receive food, in this case French fries, from food dispensing lanes 234, 236 and 238 of dispensing device 200, which food has been subsequently fried after dispensing in fry wheels 410, 412 and 414 of fry device 400. After frying in any of wheels 410, 412 and 414 of fry device 400, food dispensed therefrom enters inlet chute 604, as illustrated in FIGS. 3 and 28, for example. In inlet chute 604 the food

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travels downwardly along chute 604 and into rotatable food dispensing member 606 in the direction of arrow M of FIG. 28 and arrow E of FIG. 3. Inlet chute 604 can be configured as desired and may be configured to accept the product from any one or all of fry wheels 404, 410, 412 and 414. In FIGS. 25-27, a holding area 607 receives product from fry wheel 404 for manual packaging. A manual or automated diverter bar 605 can optionally be provided as shown in FIG. 27 to divert French fries from device 600 to permit filling unsalted fry orders. Bar 605 can be moved between open and closed positions as indicated by arrow Z, such as by a cylinder (not shown).

[0236] Rotatable food dispensing member 606 in the illustrated embodiment is a dispensing wheel that is mounted for rotation in dispensing device 600. Dispensing member 606 has a plurality of food containing compartments 640 that are arrayed around the periphery of rotatable food dispensing member 606. Each of compartments 640 is divided from another compartment by a compartment wall 642. Preferably, each compartment wall 642 is not normal to peripheral edge 644 of rotatable food dispensing member 606 but at a slight angle such as, for example, as illustrated in FIG. 29 and FIG. 61.

[0237] Wheel 606 includes a pair of opposed rim portions 646a and 646b and a circular ring portion 648 that interconnects opposed rims 646a and 646b. Circular ring 648 is disposed close to the peripheral edges of rims 646a and 646b and defines peripheral edge 644. Preferably, circular ring 648 is constructed of a perforated metal material so that circular rims 646a and 646b have perforations 650 there-through as illustrated in FIG. 28, for example.

[0238] In accordance with the illustrated embodiment, rotatable dispensing member 606 is configured as a rotatable wheel although other embodiments are within the scope of the invention. For example, a rotatable dispensing member in accordance with the invention could be a portion of a wheel, such as a semicircular or other configuration.

[0239] In the illustrated embodiment, rotatable food dispensing member 606 is rotated by a drive mechanism 652. Drive mechanism 652 consists of a motor 654 that drives a drive wheel 656. Drive mechanism 652 is controlled by a suitable control mechanism to cause rotation of drive wheel 656 and hence rotatable food dispensing member 606 in a desired direction and at a desired rate of speed. Drive wheel 656 can be a pressure roller or alternatively can be a drive wheel like or similar to drive wheel 468 previously described with respect to FIG. 14. Rotatable food dispensing member 606 can be driven via one or both of opposed rims 646a and 646b. Alternatively, and as illustrated in FIG. 28, rotatable food dispensing member 606 is driven through a drive rim 658. Each of rotatable food dispensing members 606 and overflow food collection member 613 rest on spaced apart rollers 660 and 662. Each of rollers 660 and 662 are constructed to bear the weight of rotatable food dispensing member 606 and overflow food collection member 613 and have a length that spans both. Alternatively, separate rollers or some other supporting structure could be used to support rotatable food dispensing member 606 and overflow food collection member 613. An inner curved fender or baffle member 664 as illustrated in FIG. 29 is provided to ensure that food contained in compartment 640 of rotatable food dispensing member 606 does not prematurely dis-

charge. Preferably, fender 664 follows the inner curvature of rotatable food dispensing member 606 and has perforations 666, which can be similar to perforations 650 of circular ring 648. Fender 664 is suitably mounted so that it is stationary relative to rotatable food dispensing member 606. A similar fender could also be provided for overflow food collection member 613, if desired (not shown).

[0240] Referring to FIG. 61, there is illustrated an elevation view of a portion of rotatable food dispensing member 606 which is typically rotated in the direction of arrow Y when viewed from the front of food packaging device 600. Fender 664 prevents food, in this case French fries FF, from falling from compartments 640 prematurely.

[0241] Overflow food collection member 613 is configured to collect food deposited from food dispensing chute mechanism 608 that is intended to be received into container 611 when held in position to receive food from food dispensing chute mechanism 608 which food does not stay in container 611. This can occur since oftentimes it is desirable to overfill container 611 so that food is mounded up above the top surface of container 611. Also, for food such as French fries, such food material fills container 611 somewhat randomly and it is typical for French fries to dangle over the sides of container 611. In the illustrated embodiment, overflow food collection member 613 is configured in a manner similar to rotatable food dispensing member 606 previously described. Thus, food collection member 613 includes opposed rims 668a and 668b and circular ring 670 having perforations 672. Circular ring 670 connects opposed rims 668a and 668b in a manner as previously described with respect to member 606. In addition, food collection member 613 has a plurality of inner compartments that are similar in construction to compartment 640 previously described with respect to member 606. Member 613 also has a drive rim 674 and is driven by a drive mechanism 676 that is similar to drive mechanism 652 previously described including a drive wheel 676' and a motor 678. Drive mechanism 676 is configured to rotate food collection member 613 in either a clockwise or counterclockwise direction as hereinafter described in more detail.

[0242] Food collection member 613 also includes a plurality of compartment walls 680 that are similar to compartment walls 642 previously described with respect to rotatable food dispensing member 606, providing a plurality of food containing compartments 682.

[0243] Each of food dispensing member 606 and food collection member 613 has bottom portions that are disposed through an opening 684 in countertop surface 636 of cabinet 602. The construction of the illustrated embodiment permits food dispensing member 606 and overflow food collection member 613 to be readily removed from food packaging device 600 such as for cleaning and/or repair.

[0244] A heating system as described can be incorporated into food packaging device 600 to supply heat to food contained therein. For example, a heating system 681 can be provided, which is illustrated in FIG. 29. Heating system 681 includes a heating device 683 having a heating element 685, located above dispenser 606 as desired. Heating devices 687 and 689 may also be included within dispenser 606 and/or 613 as desired. The heating devices may comprise radiant heaters and can be ceramic heaters, for example. Any suitable type of heating device or system can

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be used in accordance with the invention. Heating system 681 can be controlled by packaging control 118, for example. In addition, a heating device can be provided to direct heat to food container pick up location 622, if desired to keep food contained thereat warm.

[0245] Referring to FIGS. 1, 3, 25-26, 28-29 and 43-44, various aspects of the configuration and operation of food dispensing chute mechanism 608 are illustrated and will be described. Food dispensing chute mechanism 608 includes an upper chute 686, a lower chute 688, a chute support member 690, a connecting link 692, a stop member 694, a rotatable link 696 connecting stop member 694 to chute support member 690, a rotatable link 698 connecting upper chute 686 to support member 690, a cylinder 700 for operating food dispensing chute mechanism 608, a load cell 702 for weighing the contents of food contained in food dispensing chute mechanism 608 and a rotatable link 704 connecting cylinder rod 706 to upper chute 686.

[0246] Upper chute 686 preferably and as illustrated in the referenced figures, forms part of food dispensing chute mechanism 608, and has an inlet location 708 for receiving food dispensed from rotatable food dispensing member 606 and a discharge location 710 for dispensing food contained in food dispensing chute mechanism 608 and into a container, such as container 611 as illustrated in FIG. 43, for example.

[0247] Upper chute 686 of food dispensing chute mechanism 608 is positioned to receive pieces of food from a discharge location 712 of rotatable food dispensing member 606. Upper chute 686 has a food holding area 714 for holding food received from rotatable food dispensing member 606. A weighing device is associated with food dispensing chute mechanism 608 so that the amount of food contained therein, such as in food holding area 714, can be determined. Any suitable device can be utilized to determine the amount of food contained in food dispensing chute mechanism 608. In the illustrated embodiment, a load cell 702 is provided to determine the weight of food contained in food dispensing chute mechanism 608 and is illustrated schematically in FIGS. 43 and 44, for example.

[0248] FIG. 44 illustrates food dispensing chute mechanism 608 in the upper position ready to receive food from rotatable food dispensing member 606. In that configuration, cylinder 700 is retracted and upper chute 686 is generally horizontal. This configuration allows a quantity of food to be dispensed into upper chute 686 and into food holding area 714 without being dispensed therefrom. When a sufficient quantity of food is deposited in upper chute 686, such as French fries FF, as determined by load cell 702 which communicates with the control system of food packaging device 600, the food contained therein is ready to be dispensed. Typically, the amount of food contained in chute 686 will be sufficient to adequately fill container 611. Since container 611 is of a known size, rotatable food dispensing member 606 can be operated to supply food to chute 686 until a desired quantity is contained therein for dispensing to container 611.

[0249] To dispense food from food dispensing chute mechanism 608, cylinder 700 is activated to extend cylinder rod 706 upwardly thereby causing upper chute 686 to drop. Since lower chute 688 is connected to upper chute 686 via connecting link 692, lower chute 688 also drops to the

discharge position as illustrated in FIG. 43 which movement is indicated by arrow S. Stop 694 which is connected to lower chute 688 and pivotally mounted via rotatable link 696 to chute support member 690, engages chute support member 690 as illustrated in FIG. 43 and prevents further downward movement of upper chute 686 and lower chute 688. In addition, stop member 694 engaging chute support member 690 defines the lowermost position of upper chute 686 and lower chute 688 which is also the dispensing position of food dispensing chute mechanism 608, as illustrated in FIG. 43. This position also provides discharge location 710 of dispensing chute mechanism 608.

[0250] Referring to FIGS. 25-28, there is illustrated container storage magazine 638, which can form part of food packaging device 600. Container storage magazine 638 is configured to store a plurality of different sized food containers in an unerected form. Typically, container storage magazine 638 will be configured to hold a variety of different sized containers. In the illustrated embodiment, container storage magazine 638 can contain four different sizes of French fry containers or cartons. Container storage magazine 638 includes a base 716 that is suitably mounted with mounting structure 718 to cabinet 602. Preferably, mounting structure 718 permits container storage magazine 638 to be readily removed to permit access to rotatable food dispensing member 606 and overflow food collection member 613.

[0251] Base 716 typically can be in the form of a base plate and includes four apertures 720, 722, 724 and 726, each of said apertures corresponding to the profile of a different size collapsed carton. Apertures 720, 722, 724 and 726 are dimensioned to be able to retain a stack of cartons in a collapsed or unerected condition as illustrated in FIG. 25 in which a plurality of unerected cartons 728 are stacked therein.

[0252] Each aperture 720, 722, 724 and 726 and base 716 has associated therewith a plurality of guide members 730-760. In the illustrated embodiment, guides 730-760 are in the form of post or tubular-type members. Each set of four guide members is associated with a specific one of apertures 720, 722, 724 and 726 to define and permit stacking of a plurality of unerected French fry cartons or containers that generally correspond in size to the size of apertures 720, 722, 724 and 726, respectively. It is to be understood that other arrangements to define a container stack can be utilized in accordance with the invention. For example, in place of guides 730-760 other structure could be utilized, such as upstanding walls or partial walls or other types of guides.

[0253] Container storage magazine 638 may also include a suitable removable cover (not shown) to enclose base 716 and the volume defined over apertures 720-726 by guides 730-760.

[0254] Container storage magazine 638 is preferably positioned to permit ready access to the bottom of each container stack through the bottom of each of apertures 720-726 by automated container handling system 610, which is herein-after described in detail.

[0255] Food packaging device 600 includes automated container handling system 610. Automated container handling system 610 is capable of retrieving an unerected

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container through any of apertures 720, 722, 724 and 726 of unerected container storage magazine 638, erecting the unerected carton, holding the erected carton in position at discharge location 710 of food dispensing chute mechanism 608 and depositing the filled container onto conveyor system 614, which conveyor system 614 subsequently transports the filled container to a desired location.

[0256] Referring to FIGS. 1, 25, 27-28 and 30-44, there is illustrated automated container handling system 610 and elements and features thereof. Automated container handling system 610 includes a container retrieving and grasping device 762, a container grasping device 764 and a container bottom urging device 766.

[0257] Automated container handling system 610 is controlled by a suitable control system for food packaging device 600.

[0258] Container retrieving and grasping device 762 and portions thereof are best illustrated in FIGS. 30-39. Container retrieving and grasping device 762 includes a mast 768, which is mounted to a carriage system 770, a moveable rack member 772, a pinion 774, a frame 776, a container grasping member 778 and a linkage assembly 780.

[0259] Mast 768 is carried by carriage system 770 which carriage system 770 allows for lateral translation of mast 768 and the components associated therewith, including moveable rack member 772, pinion 774, frame 776, container grasping member 778 and linkage assembly 780. Carriage system 770 includes a guide member 782, a worm gear 784, a drive mechanism 786 and a carriage follower 788. Carriage follower 788 supports a vertical translation mechanism 790 that, in turn, carries mast 768.

[0260] Carriage guide 782 is an elongated guide that defines the lateral translation movement direction of carriage follower 788 and is secured within cabinet 602. Worm gear 784 is disposed parallel to carriage guide 782 and when rotated moves carriage follower 788 along carriage guide 782.

[0261] Worm gear 784 is driven by drive mechanism 786 which can include a drive motor 792, a drive gear or pulley 794 and a driven gear or pulley 796. Where drive and driven pulleys are used, typically a belt 798 will impart rotation from one pulley to another.

[0262] Drive motor 792 causes worm gear 784 which is mounted for rotation and which is rotated by rotation of driven pulley or gear 796 in either direction. Drive motor 792 can be an AC or DC motor or a stepper or servo motor as desired. Suitable sensors can be employed (not shown) to determine the position of carriage follower 788 which determines the lateral position of container grasping member 778.

[0263] Carriage follower 788 is composed of a frame 800 having a guide aperture or slot 802 in which carriage guide 782 is disposed and a threaded aperture or slot 804 in which elongated worm gear 784 is disposed to impart lateral motion to carriage follower 788 by rotation of worm gear 784. Thus, carriage system 770 provides lateral movement in the direction of arrows Q as shown in FIG. 39. In this manner, carriage follower and thus mast 768 can be laterally translated as desired.

[0264] A suitable opening 806 is located in countertop surface 636 of cabinet 602 to permit mast 768 to extend therethrough.

[0265] Mast 768 can be raised and lowered in a vertical direction as indicated by arrow V in FIG. 39.

[0266] Mast 768 can be vertically raised and lowered in the directions indicated by arrow V in FIG. 39 by operation of a drive mechanism 810 that forms part of vertical translation mechanism 790. Vertical translation mechanism 790 is a vertically extending carriage system similar to that described with respect to carriage system 770 and includes a drive mechanism 810 which is composed of a motor 812 which is carried by carriage follower 788, a vertically disposed carriage guide 814, a vertically disposed worm gear 816 which is driven in a suitable manner by motor 812 such as previously described with respect to drive mechanism 786 of carriage system 770, which can be controlled in a similar manner. Vertical translation mechanism 790 also includes a vertical carriage follower 818 having a threaded aperture or slot and a guide aperture or slot (not shown) which vertical carriage follower 818 is secured to mast 768.

[0267] Mast 768 has mounted thereto frame 776, typically at an upper end thereof. Linkage assembly 780 is secured to frame 776 as well as pinion 774 and moveable rack member 772.

[0268] Moveable rack member 772 includes a frame 820 having a guide slot 822 vertically disposed therein and a rack 824 which meshes with pinion 774. Moveable rack member 772 may also include extra mass in the form of a weight block 826 to help urge moveable rack member downwardly when not restrained.

[0269] A pair of guides 828 and 830 are rigidly secured to frame 776 and are disposed within slot 822 of moveable rack 772. A spring 832 can be connected between an upper end of moveable rack member 772 and guide 828 or 830 to urge moveable rack member 772 to a lower position as illustrated in FIG. 30 compared with the upper position as illustrated in FIGS. 34-37.

[0270] In a preferred embodiment, moveable rack member 772 includes a stop 834 which stop can be vertically adjustable. While stop 834 is located at the bottom of moveable rack member 772 it is to be understood that a stop could be provided at another location provided that a suitable engaging surface at a proper location is provided.

[0271] Mounted to frame 776 is an axle 836 that is mounted for rotation relative to frame 776. Axle 836 has pinion gear 774 rigidly secured thereto as well as one end 838 of linkage 780. The other end 840 of linkage 780 is securely mounted to frame 776 as illustrated in FIGS. 30-37, for example.

[0272] Linkage 780 which carries container grasping member 778 is composed of a plurality of links so that container grasping member 778 is moveable from a horizontal position as illustrated in FIGS. 30-32 to a vertical position as illustrated in FIGS. 34-37. When container grasping member 778 is in the horizontal position it is utilized to grasp and retrieve a desired size of container from one of the apertures 720, 722, 724 and 726 from container storage magazine 638. For this purpose, container grasping member 778 includes a suction cup device 840 which

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includes at least one suction cup 842 and in the illustrated embodiment two suction cups 842 and 844 arrayed in substantially the same plane for grasping a container having a surface to be grasped by both suction cups 842 and 844 in the same plane. Suction cup device 840 also includes a vacuum source 846, a release valve 848 and a suitable vacuum line 850 which connects suction cups 842 and 844 to vacuum source 846, as illustrated in FIG. 30, for example. In operation, when suction cups 842 and/or 844 engage a container or other member to be grasped, vacuum source 846 is activated to supply vacuum to suction cups 842 and 844, such as to grasp and retain a container from one of apertures 720, 722, 724 and 726 of container storage magazine 638.

[0273] Linkage assembly 780 includes, in the illustrated embodiment, a first link 852, a second link 854 and third link 856

[0274] First link 852 is rigidly secure to axle 836 and pinion 774. First link 852 is configured in an L-shape with the end of first link 852 opposite the portion connected to axle 836 pivotally connected to second link 854 having one end being pivotally connected to first link 852 via pivot connection 858.

[0275] Second link 854 is connected to third link 856 via a universal joint connection 860 a location spaced apart from pivot connection 858 as illustrated in, for example, FIGS. 30-37. Suction cups 842 and 844 are mounted to second link 854. An offset member 862 which depends from second link 854 provides a desired offset for universal joint connection 860 which connects second link 854 to third link 856.

[0276] Third link 856 is, in turn, connected to frame 776 via a universal joint connection 864 which is at a distance removed from universal joint connection 860 which connects third link 856 to second link 854. An offset member assembly 866 is rigidly secured to frame 776 and includes an angled block 868 and an offset extension 870 to provide the desired angled and clearance for universal joint 864 and third link 856.

[0277] In operation, when moveable rack member 772 is moved relative to mast 768, such as when stop 834 contacts a surface, such as in the illustrated embodiment, countertop surface 636 as illustrated in FIG. 36, continued downward vertical movement of mast 768 causes rack member 772 to move upwardly relative to mast 768. This causes rotation of pinion 774 which meshes with rack 824 mounted to rack member 772. Rotation of pinion 774 in a counter-clockwise direction in FIG. 30 causes rotation of first link 852. Such rotation causes downward movement of that portion of first link 852 that is pivotally connected to second link 854 via pivot connection 858. Such movement, in turn, causes second link 854 to pivot upwardly about pivot connection 858 in a clockwise direction as viewed in FIG. 30 to cause suction cups 842 and 844 to move to a vertically oriented position as depicted in FIGS. 34-37 from the horizontally oriented position depicted in FIGS. 30-33. In addition, such movement of first link 852 causes movement in rotation of third link 856 and universal joint connection 860 and 864 to the position indicated in FIGS. 34-37. When container grasping member 778 is in the position indicated in FIGS. 34-37, an unerected container held by suction cups 842 and/or 844 will be vertically oriented when suction cups 842 and/or 844 are attached to the container sidewall, as illustrated in FIG. 40, for example.

[0278] In a typical operation, container retrieving and grasping device 762 will be operated to position suction cups 842 and 844 below a container to be selected from container storage magazine 638. Mast 768 will be raised by operation of vertical translation mechanism 790 to a desired height so that suction cups 842 and 844 engage a container contained at the bottom of container storage magazine 638. Vacuum source 846 is activated and mast 768 can be lowered to remove a container from a desired one of apertures 720, 722, 724 and 726 of container storage magazine 638. Carriage system 770 can be activated to move container retrieving and grasping device 762 laterally to a desired location. Such lateral movement can be controlled by properly positioned sensors 872, 874, 876, 878 and 880, for example. For example, sensor 872 can define the position to retrieve a container from aperture 720, sensor 876 to retrieve a container from aperture 722, sensor 878 to retrieve a container from aperture 724 and sensor 880 to retrieve from aperture 726. Sensor 874 can be positioned to define the proper location of container grasping member 778 to erect the container that has been retrieved from one of apertures 720, 722, 724 or 726 of container storage magazine 638, as hereafter described. After erecting the container, the vacuum applied to suction cups 842 and 844 is released by operation of release valve 848 which permits suction cups 842 and 844 to disengage and release the container that had been grasped. Mast 768 can then be raised causing stop 834 to be removed from countertop surface 636 and by action of weight 826 and operationally spring 832, causing rack member 772 to move downwardly relative to mast 768 thereby rotating pinion gear 774 clockwise relative to the position shown in FIG. 34, thereby moving linkage assembly 780 to cause movement of container grasping member 778 from the position illustrated in FIGS. 34-37 to the position indicated in FIGS. 30-33, where container grasping member 778 is in position to retrieve a desired carton from container storage magazine 638 in a manner previously described, which includes lateral translation of container grasping member 778 by carriage system 770.

[0279] It is to be understood that any suitable automated device or system for retrieving, grasping and moving a container to a desired location as desired herein can be utilized in accordance with various aspects of the present invention. Thus, various aspects of the present invention are not limited by the particular embodiment of container retrieving and grasping device 762 and components thereof described herein. For example, an automated or robotic arm could be utilized to select, grasp and retrieve erected or unerected containers from a source as desired and then erect the carton or container in a suitable manner, followed by holding the erected container at dispensing location 710 and after filling placing the filled container, such as container 611 on to a suitable conveyor to move the filled container to a desired location.

[0280] Container grasping device 764 of container retrieving and grasping device 762 will now be described, and in particular with reference to FIGS. 38 and 40-44.

[0281] Container grasping device 764 includes a rotatable and vertically translatable mast 884. Mast 884 can be rotated as illustrated by arrow P in FIG. 38 and vertically translated up and down as indicated by arrow 0 also in FIG. 38. Mast 884 is connected to a shaft 886 via a slot and key arrangement between mast 884 and shaft 886 permitting mast 884

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to be rotated by shaft 886 which, in turn, can be rotated by a step or motor 890 or other suitable motor or device to rotate shaft 886 a desired degree. Motor 890 drives a drive pulley or gear 892 which, in turn, drives a driven pulley or gear 894. In the case where pulleys are utilized, a belt 896 is used to transmit rotation from pulley 892 to pulley 894. Motor 890 can be a stepper motor or a servo motor as desired. Alternatively, an AC or DC motor can be utilized provided that a suitable control is provided so that the orientation of mast 884 can be determined. A carriage system 898 is utilized to provide the desired vertical movement of mast 884 in up and down directions. Carriage system 898 is similar to carriage system 770 previously described and includes a carriage guide 900, a worm gear 902, a carriage follower 904, a drive mechanism 906 which includes a motor 908 (which can be a servo motor or an AC or DC motor) suitably controlled to drive or gear 902. Carriage follower 904 includes a threaded aperture or slot 910 which communicates with worm gear 902 and a threaded aperture or slot 912 in which guide 900 is disposed. A carriage follower interface 914 connects carriage follower 904 to mast 884 and permits shaft 886 to rotate with respect to carriage follower interface 914. Thus, in operation, rotation of motor 908 rotates worm gear 902 thereby translating carriage follower 904 up or down depending on the direction of rotation. A suitable sensor (not shown) can be employed to determine the height of mast 884 for control by control system 118 for packaging device 600.

[0282] Suitable mounting structure 916 is provided to mount container grasping device 764 to a desired location, such as within cabinet 602. A slot and key arrangement between shaft 886 and mast 884 permits 884 mast to be vertically translated either up or down while shaft 886 is rotated.

[0283] Mounted on the upper end of mast 884 is a suction device 918 which includes a suction cup 920, a source of vacuum (not shown) for suction cup 920 and a release valve (not shown) for releasing the vacuum to suction cup 920. Vacuum can be supplied from within mast 884 to suction cup 920 by a suitable connection as is known in the art.

[0284] Container bottom urging device 766 consists of a mast 922 that is vertically translatable up and down by suitable apparatus (not shown). Such apparatus can be similar to vertical translation mechanism 790 previously described with respect to container retrieving and grasping device 762. Preferably, mast 922 has a blunt end 924.

[0285] In operation, container retrieving and grasping device 762 selects an appropriately sized container from container storage magazine 638 as directed by the control system for food packaging device 600. After retrieving the container, which in this case is container 611, container retrieving and grasping device 762 moves container 611 to a position as indicated in FIG. 40 against suction cup 920 so that opposed sidewalls of container 611 are grasped by suction cups 840 and 842 of container grasping member 778.

[0286] Next, as shown in FIG. 41, container grasping member 778 is moved laterally away from suction cup 920 while maintaining suction on suction cups 840, 842 and 920. Container 611 is partially erected as shown in FIG. 41 with bottom 611b depending downwardly slightly. Container bottom urging device 766 is then activated as illustrated in FIG. 42 to urge bottom 611b of container 611 upwardly into

the fully erected position. Container grasping member 778 is released and retracted from container 611 and returned to a horizontal up position to select another unerected container for erection.

[0287] Next, mast 884 is rotated approximately 90° by motor 890 to place container 611 in discharge position 710 of food dispensing chute mechanism 608. Food dispensing chute mechanism 608 is then lowered to discharge French fries FF therefrom and into container 611. Any French fries that are not received into container 611 are collected by overflow food collection member 613 which is then rotated clockwise in the direction of arrow X as shown in FIG. 41 to recycle such French fries to upper chute 686 for subsequent delivery to another container. After the French fries are dispensed from food dispensing chute mechanism 608, cylinder 700 is retracted placing food dispensing chute mechanism 608 in the upper position as shown in FIG. 44. Mast 884 can then be rotated back and forth slightly (e.g., such as 2° to 20°, for example) to simulate shaking to dislodge any loose French fries or dangling French fries in container 611 and any dislodged French fries will then fall into overflow food collection member 613 for subsequent recycling. Mast 884 can also be raised and lowered slightly and relatively quickly either before, during or after the angular rotation to further simulate shaking. Thereafter, mast 884 is rotated approximately 180° until container 611 is directly over container-receiving receptacle 612 as indicated by T in FIG. 44. Mast 884 is then lowered by operation of carriage system 898 until the bottom of container 611 rests in container-receiving receptacle 612. Then, the vacuum supplied to suction cup 920 is released and suction cup 920 releases from container 611. Mast 884 can then be rotated 900 so that it is in position to receive another container to be erected.

[0288] Container-receiving receptacle 612 is then transported via conveyor system 614 which will now be described in detail.

[0289] Conveyor system 614 and portions or elements thereof are illustrated in various figures including FIGS. 1, 25-29 and 45-50.

[0290] Conveyor 614 includes, in the illustrated embodiment, raceway 620 which can be formed along the surface of countertop 636 or on some other surface as desired. Raceway 620 is preferably in the form of a continuous loop raceway and is defined by spaced apart guides 620a and 620b mounted to countertop 636 to guide receptacles 612. Conveyor system 614 includes one or more and typically a plurality of container-receiving receptacles 612 which are illustrated in detail in FIGS. 46-50. Gate structure 634 of conveyor system 614 includes a first gate 926 and second gate 928. First gate 926 is moveable and typically second gate 928 can be stationary as hereinafter described.

[0291] Conveyor system 614 also includes structure for causing movement of container-receiving receptacle 612. In the illustrated embodiment, container-receiving receptacles 612 are moved via an endless loop 930 that can be located beneath countertop 636. Endless loop 930 carries a plurality of magnets 932 as illustrated in FIGS. 45 and 49, for example. Magnets 932 are spaced along endless loop 930. Endless loop 930 may comprise a chain or other suitable structure that can be driven by a drive system that includes sprockets 934, 936, 938 and 940. One of sprockets 934, 936, 938 and 940 can be a driven sprocket.

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[0292] Any suitable endless loop 930 can be utilized such as a belt or a chain. Pulleys could be used in place of sprockets 934-940. The route of endless loop 930 follows the route of raceway 620.

[0293] Container-receiving receptacle 612 typically includes a base 942 and a container-receiving well 944 located over base 942. Base 942 includes an enclosed compartment 946 which can be conveniently accessed by a base plate 948 located along the bottom of base 942 that is fastened to base 942 by suitable fasteners 950. Contained within enclosed compartment 946 is a magnet 952.

[0294] Container-receiving receptacle 612 follows the movement of magnet 932 due to magnetic attraction between magnets 932 and 952 thereby causing movement of container-receiving receptacle 612 along raceway 620.

[0295] Enclosed compartment 946 is dimensioned to permit magnet 952 to be free to rotate therein allowing container-receiving receptacle 612 to be readily guided by rails 954 and 956 that are raised above countertop 636.

[0296] Movable gate 926 prevents movement of container-receiving receptacle 612 located thereat as illustrated in FIG. 45. This ensures that container-receiving receptacle 612 is in position to receive a loaded container of French fries, such as container 611 from container grasping device 764. After a filled container is placed on container-receiving receptacle 612 adjacent moveable gate 926, gate 926 is automatically removed by a suitable mechanism (not shown) to permit container-receiving receptacle 612 thereat to be moved by conveyor system 614 until French fry container 611 contained therein contacts gate 928 or receptacle 612 contacts another receptacle that is located at pick up area 622 as shown in FIG. 45. Once container 611 is moved from receptacle 612b, receptacle 612b is then free to move along raceway 620 and passes underneath second gate 928, which can be a stationary gate. Alternatively, second gate 928 could be a moveable gate and could be located at a level that directly prevents movement of receptacle 612b. After receptacle 612b passes underneath second gate 928, receptacle 612a is moved into the position formerly occupied by receptacle 612b provided that receptacle 612a has a French fry container thereon which would then cause receptacle 612a to be stopped at gate 928. Similarly, when that container is removed from receptacle 612a, receptacle 612a would then be free to pass underneath gate 928 and around that portion of raceway 620 until encountering gate 926 or another receptacle that is stopped by gate 926.

[0297] Referring to FIGS. 51-60, there is illustrated various views of French fry cartons that are useful in accordance with the present invention. The French fry cartons depicted in FIGS. 51-60 are particularly suitable for use in conjunction with the present invention since the cartons readily stand upright without assistance and can be erected by automated container handling system 610, previously described.

[0298] FIG. 51 illustrates a front elevation view of a carton 1012 that is particularly suitable for containing French fries, for example. Carton 1012 is illustrated in FIG. 51 in an erected or opened position and includes a pair of opposed curved sidewalls 1014 and 1016 and a bottom panel 1018.

[0299] Carton 1012 can be stacked in a collapsed configuration and stored in a suitable magazine, such as container

storage magazine 638 as previously described. When in a collapsed position, carton 1012 is particularly suited to being opened or erected by pulling sidewalls 1014 and 1016 apart and urging bottom panel 1018 upwardly, as described with respect to the erection or opening of container 611 by automated container handling system 610. Container or carton 611 is of a design that is similar to carton 1012.

[0300] Carton 1012 also includes two supporting legs 1020, 1022 that extend downwardly from the lower portions of the overlapping edge portions of sidewall 1014 indicated by reference numerals 1014a and 1014b in FIG. 59 and FIG. 53.

[0301] Carton 1012 is capable of standing on its own because of legs 1020 and 1022 that extend below bottom panel 1018 when carton 1012 is open or erected.

[0302] Carton 1012 can be constructed from a single blank of paperboard which is illustrated in FIG. 59. When constructed, sidewall edge portions 1014a and 1014b form flaps that are glued to the edges of sidewall 1016 as indicated in FIG. 54, for example.

[0303] Bottom panel 1018 is specially configured to facilitate opening or erection of carton 1012 by an automated carton handling device such as automated container handling system 610, previously described in detail. Bottom panel 1018 includes intersecting lines 1024 and 1026. Intersecting lines 1024 and 1026 intersect at a generally central location of bottom panel 1018, which panel is generally oval even though it may incorporate straight edges 1028 and 1030, for example. Intersecting lines 1024 and 1026 may be fold lines, lines of weakening, score lines or even perforations. All such structures are referred to herein with respect to intersecting lines 1024 and 1026 of bottom panel 1018 only as "fold lines." Typically, the intersection of fold lines 1024 and 1026 form an angle in the range of from about 60° and about 120°. In one embodiment, the intersecting bottom panel fold lines are oriented such that one of said lines (fold line 1024 in FIG. 59) is normal or at least generally normal to curved sidewalls 1014 and 1016. In such embodiment, the other of the intersecting fold lines (in this case fold line 1026) is at least generally parallel to curved sidewalls 1014 and 1016.

[0304] Preferably, fold line 1024 extends from sidewall 1014 to sidewall 1016.

[0305] As previously mentioned, carton 1012 is foldable to a collapsed position with sidewalls 1014 and 1016 being planar and in contacting overlying relation to each other with bottom panel 1018 being divided into two overlying panels 1018a and 1018b by intersecting fold line 1026.

[0306] Preferably, bottom panel 1018 includes two additional fold lines 1032 and 1034 on either side of fold line 1024 that extends from one carton sidewall to the other, in this case from sidewall 1014 to sidewall 1016. Secondary fold lines 1032 and 1034 further facilitate the opening or erection of container 1012 with an automated device such as automated container handling system 610.

[0307] FIG. 58 illustrates a carton 1036 that is similar in construction to carton 1012 previously described except that carton 1036 is of a different size. Preferably, carton 1012 is configured such that the width of the base is relatively narrow and the sidewalls 1014 and 1016 flare outwardly so

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that container 1012 is substantially wider at the top (from about 1.6 to 2 or more times the base width) This allows relatively large and tall containers to be placed in an automobile cup holder CH as depicted in FIG. 56

[0308] Referring to FIG. 2, there is illustrated an alternate embodiment of an automated food processing system 101 in accordance with the invention Automated food processing system 101 includes a food dispensing device 201 which is similar to food dispensing 200, previously briefly described, where like reference numerals represent like elements Food dispensing device 201 includes fewer uncooked bulk food dispensing containers 204 and additional magazine food dispensers that are similar to magazine food dispenser 206, previously referred to Otherwise, dispensing device 201 is similar to dispensing device 200 previously described.

[0309] Automated food processing system 101 also includes fry device 400 which has been described.

[0310] One primary distinction between automated food processing system 100 and automated food processing system 101 is that automated food processing system 101 does not include an automated packaging device such as automated packaging device 600. In place of food packaging device 600, a food storage device 635 is provided. Food storage device 635 allows food cooked by food frying device 400 to be stored in a heated environment for subsequent manual processing As configured in FIG. 2, food storage device 635 includes separate product receiving receptacles 637, 639, 641 and 643 Each receptacle 637, 639, 641 and 643 is dedicated to receiving food from a respective one of fry wheels 410, 412, 414 and 404, respectively. In addition, each receptacle 637-643 can have placed therein a suitable container to receive food, such as handled trays 645, 647, 649 and 651.

[0311] As illustrated in FIG. 2, a food item F is being discharged from fry wheel 414 down a chute 653 and into handled tray 649 contained within heated receptacle 641. Food item F can be stored therein for a period of time until it is ready for subsequent processing

[0312] Referring to FIGS. 62 and 63, there is illustrated heated receptacle 643 in a cross-sectional view and FIG. 63 is a cross-sectional view taken along line 63-63 of FIG. 62 showing the entire width of receptacle 643

[0313] As illustrated in FIGS. 62 and 63, heated receptacle 643 is a heated well having a heating element that heats sidewalls 962, 964, 966 and 968 as well as bottom 970 of heated receptacle 643. Heating element 960 is in close proximity to walls 962, 964, 966 and 968 as well as bottom 970. Heating element 960 may be composed of a single heating element or multiple heating elements as desired Suitable controls may be provided to adjust the temperature of walls 962-968 as well as bottom 970 of heated receptacle 643 In addition, suitable insulation 972 can be contained within the cavity that is defined by cabinet 974 of food storage device 635, which is partially shown in FIGS. 62 and 63

[0314] Preferably, handled trays 645-651, such as handled tray 651 depicted in FIGS. 62 and 63 are dimensioned such that they are in close proximity to walls 962-968 and bottom 970 when placed in heated receptacle 643

[0315] Food packaging device 600 may optionally include food seasoning device 616, which is illustrated in detail in

FIGS 65-68. Food seasoning device 616 includes a hopper 972, a metering wheel 974, a wheel drive system 976, a dispensing tube 978 and a dispersion head 618.

[0316] Hopper 972 is configured to hold a desired bulk quantity of a seasoning material, such as salt S. Bulk hopper 972 includes a lid 982 that can be removed to replenish the supply of salt S contained therein. Hopper 972 can have a bottom with inwardly extending sidewalls 984 to facilitate the dispensing of material from bottom 986 of hopper 972 which may include a dispensing tube 988

[0317] Metering wheel 974 is located beneath bottom 986 and dispensing tube 988 to receive a charge of salt or other seasoning therefrom Metering wheel 974 includes a cavity 990 for receiving a charge of salt from dispensing tube 988. Metering wheel 974 is rotatably mounted in a housing 992 and can be rotated about the longitudinal axis of metering wheel 974 to cause cavity 990 to be directed downwardly which thereby causes the seasoning or salt contained in cavity 990 to fall by gravity therefrom.

[0318] Metering wheel 974 is suitably rotated by wheel drive system 976. Wheel drive system 976 can be controlled by a suitable electronic control system that can form part of the food packaging device 600. Typically, in operation, when French fries FF are dispensed from one or more of fry wheels 404, 410, 412 and 414 onto chute 604, a suitable sensing device (not shown) senses the presence of French fries and activates wheel drive system 976 of automated food seasoning device 616 to discharge a predetermined quantity of seasoning, such as salt, onto the French fries that traverse chute 604.

[0319] Dispensing head 618 can be located in a desired position to apply seasoning to the food traversing chute 604. As illustrated in FIG. 3, for example, dispensing head 618 can be located towards a bottom portion of inlet chute 604 and may extend over a portion of rotatable food dispensing member 606

[0320] Wheel drive system 976 as illustrated in FIGS. 65-68 includes a solenoid plunger 994 for driving a linkage 996 that is connected to metering wheel 974 to impart rotation to metering wheel 974. Linkage 996 includes a crank arm 998, one end of which is connected to a central portion of metering wheel 974 and the other end is connected to a lever arm 1000 which, in turn, is connected to solenoid plunger 994. Lever arm 1000 can be driven by solenoid plunger 994 which, in turn, causes crank arm 998 to be driven, thereby rotating metering wheel 974 sufficiently to cause cavity 990 to be directed downwardly, thereby permitting any seasoning or salt contained therein to be dispensed therefrom

[0321] A collection funnel 1002 is disposed at the discharge end of housing 992 and connects to dispensing tube 978. Dispensing tube 978 is, in turn, connected to dispensing head 618.

[0322] Dispensing head 618 can include a plurality of vanes 1004 for facilitating dispersion of seasoning dispensed therefrom. As illustrated, there are four vanes 1004 spaced 90° from each other

[0323] Dispensing tube 978 has a lower end portion 1006 that terminates some distance above dispensing cone 1008 of dispensing head 618. In one embodiment, lower end

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portion 1006 of dispensing tube 978 may terminate approximately 0.25 inches from the tip of dispersion cone 1008.

[0324] Dispersion cone 1008 includes a plurality of holes 1010 that are arrayed through dispersion cone 1008 to facilitate the distribution of seasoning or salt. In operation, as salt or seasoning is dispensed through lower end portion 1006 of dispensing tube 978, the seasoning strikes the top portion of dispersion cone 1008 and is directed into four quadrants via vanes 1004. As the seasoning traverses the surface of dispersion cone 1008, some of the seasoning falls through holes 1010 in dispersion cone 1008. Note that not all of holes 1010 are labeled, for purposes of clarity in the Figures. Other salt or seasoning particles do not fall through holes 1010 but fall off the lower end of dispersion cone 1008. Still other seasoning particles bounce or are otherwise deflected off the top surface of dispersion cone 1008 and fall a lateral distance removed from dispersion cone 1008. In this manner, a good distribution of seasoning is achieved over a relatively large area.

[0325] The Control System and Method

[0326] In one embodiment, the System Master Controller of a Server (PC), a router/hub, and a touch-screen monitor (user interface). The Master can utilize existing technology to integrate, to manage, to control, and to coordinate information flow of and through the various subsystems for overall system operation. The network technology is fully compliant with the latest version of the industry's NAFEM Protocol.

[0327] Control System Features

[0328] Referring to FIGS. 69-73, the primary functions of the Control System are to receive order information from the POS and to connect and coordinate all operating subsystem controllers with the Master Controller so that operational commands and functional information can be communicated and displayed. The result is that all the dispensing, fry and packaging modules function as one integrated fried foods production system.

[0329] In one embodiment, the Control System is event and demand driven. That is, nothing happens unless a functional component or subsystem receives a command signal to initiate the action. In a normal operation mode, the POS will provide virtually all of the system order demands. These can take the form of a string of two-bit Order Events. Typically this will be a quantity and an item (for example, 2 each regular size fries). The product description can consist of both the food item and its portion size, treated as one bit of information.

[0330] The Control System information can be categorized into Order Events, Inbound Events, and Outbound Events. The Order Events come from primarily the POS system, the historical kitchen management system (KMS) data, or the touch-screen Monitor if a manager wants to override the automatic ordering. KMS is a database of information of, for example, the sales rate of various products versus day and time. The Order Events dictate and demand the operation and performance of the automation control system for production. The Inbound Events information includes messages generated by subsystem controllers other than the POS or KMS. The Outbound Events include typical command messages issued by the Master Controller specifying functions to be performed by individual subsystem controllers.

[0331] In one embodiment, the Master Controller is configured to monitor periodically or continuously the network for events to occur. Once an event takes place and a signal is sent on the network, the Master Controller identifies the source of the signal, then compares it to the programmed schedule of events within its memory, and reacts appropriately, either sending out a new command, showing a display, storing information in memory, or all of the above.

[0332] An important source of data for the Control System can be the Kitchen Management System (KMS). The KMS is a historical database of operational information. This information can be used to set the workstation configuration, process settings, inventory levels, and set a level of production in advance of actual customer demand orders. This interface can be a two-way connection, so that all operational data from the Fried Foods Workstation can be received and stored in the KMS and/or the Control System, or evaluated, adjusted, and re-entered to "fine-tune" the process on a continuing basis.

[0333] Generally, the Control System can comprise two loops, shown in FIG. 70. The primary loop is the "Order-to-Package" loop, whereby the Master Control takes an Order Event input from the POS and directs the appropriate Packaging Module subsystem to package and deliver an appropriate portion of product. A secondary loop is the "Buffer Replacement" loop, where the Master Controller receives an Inbound Event signal from the Packaging Module that its buffer inventory of ready-to-package fried product is low and additional product must be dispensed and fried. As currently specified, all products other than salted French fries typically can have a default buffer inventory of zero, meaning that an order for that (other) product will immediately initiate a full dispense-fry-package (if packaged by the System) production routine.

[0334] In accordance with one aspect of this embodiment of the Control System, the Fryer Module vat operation is not directly controlled by the production demand cycle. Each fry vat of the fry module will operate continuously and on a pre-set uniform operating cycle. Frozen product is dropped into the fry module when additional inventory is called for. The product is fried according to the pre-set cooking cycle and then is dumped into the Packaging (or Protein) Module receiving apron. None of the cooking cycle is affected by order demands, or inventory conditions. In one embodiment, the Control System can vary the time between incremental rotation and speed of rotation of fry wheel 410 to accommodate for varying conditions, such as the level of cooking oil in the fry vat. The level of cooking oil can vary as a result of the amount of product that is being fried in a particular fry vat, since product present in the fry vat displaces cooking oil, thereby raising the level of cooking oil in the fry vat particularly since the product is held below the cooking oil surface during a cooking cycle. Preferably, to ensure the workstation reliability and system uptime, extensive control redundancy can be provided. As a result, the control subsystems for each Fryer Module vat and each Dispensing Module chute are designed and constructed as individual units that operate even if one or more subsystem fails.

[0335] Additionally, the control of the Dispensing Module freezer environment and operation can be an independent subsystem.

[0336] Preferably, the Control System includes the capability to operate all modules individually. This allows the

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operator to disconnect and remove a module from the network and operate the remaining modules in a semi-automatic method, manually performing some of the operations. Preferably, there are controls on each module that permit an operator to operate that module's functions locally.

[0337] Orders for product are preferably processed sequentially as they are received, although the specific products within a customer order may be arranged in a logical manner as desired. The Monitor will display all products being processed by the workstation from the time the order is received until it is removed from the workstation. The status of each product that is ordered can be tracked in its various stages including, for example, on order, packaged and ready to pick up, ready to manually package, and held too long.

[0338] Preferably, products in the process of being fried can also be tracked, and cooking times for each basket in each wheel will count down to when product is ready to package.

[0339] Master Controller

[0340] In one embodiment, the Master Controller 110 hardware may suitably comprise, or equivalent:

[0341] Intel Pentium III (or higher) with 1.0 GHz (or higher) CPU

[0342] Ethernet network interface and hub

[0343] 256 MB (or more) system RAM

[0344] 20 GB (or more) hard disk drive

[0345] Touch-Screen Monitor Interface

[0346] Plug and Play Touch-Screen Monitor

[0347] SCK Gateway (Ethernet)

[0348] Interconnect cabling (as needed) Optional Keyboard and pointing device (mouse) for installation and maintenance purposes

[0349] Typical operating system software requirements are:

[0350] Windows 2000 professional (or server) SP4 or higher

[0351] A suitable Database Server, such as Fast SCK Version 3.0 (or higher) from Fast, Inc. of Stratford, Conn.

[0352] Fast SCK Version 3.0 (or higher) Utility Applications (SCK Editor, SCK Engine, SCK Events, and SCK Site Editor) from Fast, Inc.

[0353] The Subsystem Interface Modules provide the functionality to communicate specific control events (information) conditions, and/or commands to and from the Master Controller. These modules typically can be incorporated into the circuitry of controller boards. In cases where the network needs to interface with a control subsystem (such as PLCs, for example), appropriate imbedded memory interface (input-output) circuit cards known in the art can be utilized. All of the foregoing hardware and software or equivalent is readily available or can be produced by those skilled in the art.

[0354] Fryer Controller

[0355] The frying of the frozen product is controlled by a combination of cooking oil temperature and the time the frozen product is immersed in the cooking oil. Frying is accomplished by moving the frozen product through the heated cooking oil by a rotating fry wheel. As previously described, a programmable stepper or other motor can provide the desired precisely controlled movement of the fry wheel.

[0356] The following Table I lists typical control parameters and several optional parameters that can be used, if desired.

TABLE I

Fryer Module Control Signals (One set for each of 4 Product Lanes)			
Description	Input	Output	Op Adj
Set Temperature	X		X
Actual Temperature		X	
"Ready" Band Width		X	
Temperature Offset	X		
C or F	X		X
Probe #1	X		
Heater Relay #1		X	
Total Cook Time	X		X
Jog Speed	X		
Jiggle Time	X		
Cleaner Level		X	
Oil Fill		X	
Cleaner Fill		X	
Probe #2	X		
Heater Relay #2		X	
Flex Time	X		

[0357] FIG. 71 depicts a typical motor/fry wheel/basket cycle. Virtually every parameter can be fixed or adjustable as desired. For example, during one typical cycle, which may be for a preset period of time that is one-quarter of the cooking time for food contained in a compartment, fry wheel 410 is rotated clockwise 45° in the direction of arrow K of FIG. 13. After some period of time after the 45° incremental rotation, a basket shaking simulation of back and forth rotation occurs over a period of about two seconds. After a 0 to 10 second delay, another basket simulation shaking occurs. Thereafter, a period of time ("Basket Load Window") is available for loading another compartment, such as compartment 436 with a charge of French fries or other food to be fried. Thereafter, a "no load zone" or relatively short period of time towards the end of the cycle is set aside just prior to another 45° fry wheel 410 rotation in the direction of arrow K, which commences another cycle. During each cycle, three "home routines" can be employed, one after each rotation of fry wheel 410 to accurately locate fry wheel 410 so that it is properly positioned with the upper end of compartment bottom 508 of one of fry wheel 410 compartments adjacent discharge 498 and another of the compartments properly aligned to receive a charge of French fries or other food to be fried, such as from food dispensing device 200.

[0358] To ensure proper operation of the basket/fry wheel, including positioning the unit precisely for smooth loading and complete unloading, the basket/fry wheel position must be constantly synchronized. To do this, a "homing" sensor

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circuit can be utilized that resets the home position after every move of the wheel. This sensor preferably is electro-magnetic and is impervious to dirt and grease build up and has no moving parts although any suitable sensor can be used.

[0359] Dispensing Controller

[0360] The Dispensing Module control system 114 separates functions by the product delivery lane they support. In one embodiment, where there are four delivery lanes, there are four control subsystems. Each subsystem controls a vibrating product conveyor, a portioning load cell, and a dump actuator. Additionally, there are optional module configurations that affect the controls design. If lanes 1, 2, and/or 3 are configured with bulk food hoppers, a product level sensor can be provided to alert operators to reload frozen product before the hopper is empty. If each of lanes 2, 3 and/or 4 are configured with an array of coil magazines for food items, the controls must sequentially switch power to each of the motors in the lane to maintain a constant flow of frozen product.

[0361] Table II lists defined control signal parameters for each of the Dispensing Module Lane controllers:

TABLE II

Dispensing Control Signals (One set for each of 4 Product Lanes)		
Description	Input	Output
Load-Small Qty.	X	
Load-Large Qty	X	
Load Coil A	X	
Load Coil B	X	
Load Coil C	X	
Load Coil D	X	
Load Coil E	X	
Ready to Dump		X
Vibrator Frequency	X	
Bulk Fill Level		X
Time Out		X
Overweight		X
Clean Out	X	

[0362] Freezer Controller

[0363] In addition to properly dispensing products into the Fryer Module, the dispensing device 200 control 114 must also maintain a proper frozen environment for all products. To accomplish this, another controller subsystem can be provided. Table III lists the applicable control signal parameters for the freezer subsystem. A safety circuit interrupts all dispensing activity when the aisle door is opened.

TABLE III

Freezer Control Signals			
Description	Input	Output	Op Adj
Set Temperature	X		X
Actual Temperature		X	
Aisle Door Open		X	

[0364] The separation of the Dispensing Module controls into these five subsystems when there are five makes for a

convenient mechanical arrangement in the base of the module, and allows for the required flexibility given the configuration options.

[0365] In one embodiment, for manual operation, four "dispense" buttons are provided, one for each lane. One button would cause the release of a pre-set portion of the frozen product for that lane. The controls preferably should be located so the operator could by visual observation determine the appropriate Fryer basket to make sure the product dispenses into the proper basket.

[0366] Packaging Controller

[0367] Packaging Controller 118 for the Packaging Module incorporates several event signal generators for the control system to sense or read. The main Packaging Module or device 600 elements are depicted in FIGS. 25-29. In one embodiment, the Packaging Module or device control system includes two subsystems within the Packaging Module, the packaging subsystem and the heated food storage device 635 that can be used in place of packaging device 600.

[0368] The Packaging Subsystem

[0369] The packaging control subsystem initially interfaces with the Packaging Module PLC and sends packaging device 600 a signal to start the sequential operation of packaging one of an appropriately-sized portion of French fries. The actions and reactions of all the electromechanical devices (e.g., container handling system 610, dispensing member 606, overflow member 613, load cell 702 and chute mechanism 608) can be, if desired, sequenced and controlled by the local on-board controller (i.e., PLC) and not Master Controller 110.

[0370] Once the automated arm 764 sets the filled package of fries on conveyor 614 and the receptacle load gate 926 opens to allow receptacle 612 to move to the pick up area, a signal will be sent back to Master Controller 110 indicating that the particular order of fries is ready for pick up. Until that receptacle 612 moves to the return gate 928 (located at the operator right front of the Packaging Module) and the gate permits receptacle 612 to move therepast after receptacle 612 is empty, Master Controller 110 will believe (and display) that the order of fries is waiting to be picked up. Preferably, the crew member will pick up fries from right to left to ensure that the order sequence is followed and that the oldest fries are served first.

[0371] Because the number of receptacles 612 that can fit between gate 926 and return gate 928 typically is limited, Master Controller 110 intelligence preferably keeps track of how many orders of fries are in the pick up cue. This allows audible/visual alerts to be triggered on the Monitor to remind the crew that orders have been waiting. Also, even if orders are picked out of sequence, the Master Controller will remember what was on an empty receptacle 612 and clear it when it passes return gate 928.

[0372] Preferably, the Master Controller is configured to remember the hold time of each packaged fry order. If the order has not been picked up in time, the Monitor will alert the operator by audible/visual signal to "waste" that order.

[0373] The Secondary Loop

[0374] The remainder of the Packaging Module or device 600 control 118 functions address the secondary loop,

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"buffer inventory replacement" Preferably, there are two typical system requirements for the buffer inventory: (1) there must be a minimum amount of fries in member 606 or chute mechanism 608 to completely fill the next packaging order (that is, one portion of a given size); and (2) the buffer inventory is low and needs to be replenished

[0375] For the first requirement, if there is insufficient buffer inventory to fill the package, chute mechanism 608 is disabled and an error message alarm is sent. This condition should not happen, but the control intelligence prevents packaging device 600 from under filling an order

[0376] During normal operations, the level of fries in the buffer inventory will drop to a level where an inventory replenishment order will be initiated. In that event, Master Controller 110 can signal dispensing device 200 to start its fill sequence. This process should typically start soon enough that the replacement product can be fried, salted, and added to the dispensing member 606 before the "out-of-product" condition is reached. The KMS data can be integrated into the Master Control intelligence to help insure that there is replacement product in process before the actual need arises. This capability minimizes order delivery delays while also preventing the dispensing member 606 inventory growing beyond actual need

[0377] The dispensing member 606 inventory can be managed in a number of ways, as desired. For example, any of the following can be utilized and implemented by one of ordinary skill in the art: (a) direct sensors; (b) a load cell that constantly weighs the buffer inventory; and (c) a dynamic empirical calculation.

[0378] The dynamic empirical calculation embodiment uses the Master Controller to constantly calculate how much product has been added to dispensing member 606, and subtract out the portion packaged, any bonus amount, waste, and a safety factor. This empirical total will then be compared to pre-set "reload" levels. The formula may also include how much product is in process. In all cases, the buffer inventory level can be adjusted during the day to reflect actual sales levels.

[0379] The controls system design for all other (i.e., non-salted French fries) products is that the same control process would be used, but that the "buffer inventory" for those products would be defaulted to zero. That is, an order for hash browns would immediately signal an "out-of-inventory" condition and launch an "inventory replacement" command to the dispensing device 200. Later, if the need arises, controller intelligence would allow the operator to utilize some buffer inventory for these products.

[0380] Optionally, a provision can be made for unsalted French fries. Unsalted French fries would be handled like the non-French fries products. When an order for unsalted French fries is received, Master Controller 110 will signal the Packaging Module to move diverter bar 605. The next load of French fries coming from the Fryer Module will then be diverted to a portion of chute 604 of packaging device 600 for manual packaging. The extra unsalted fries can be manually returned to chute 604.

[0381] An important feature of the automated system is to maintain product integrity. One facet of that is to dispose of product that has exceeded its authorized holding time. Master Controller 110 will remember when each load of

French fries came out of fry device 400. The mechanical design of packaging device 600 assures a substantially "first in—first out" product movement. How long the "oldest" fries have been in dispensing member 606 is tracked by Master Controller 110 or packaging device controller 118, as desired. Whenever the allowable holding time has been reached, Master Controller 110 will signal the Packaging Module subsystem Controller 118 to start the buffer waste cycle (or the packaging device Controller 118 can directly control this function). It is possible that some French fries in the buffer will not have reached their limit, but through control parameter refinement, this can be minimized. Table IV lists the control signals for one embodiment of the packaging control subsystem:

TABLE IV

Packaging Control Signals			
Description	Input	Output	Op. Adj
Package #1	X		
Package #2	X		
Package #3	X		
Package #4	X		
Divert Fries	X		
Produce #5	X		
Produce #6	X		
Produce #7	X		
Produce #8	X		
Produce #9	X		
Dump Buffer	X		
Buffer Low		X	
Buffer Full		X	
Receptacle Loaded		X	
Receptacle Empty		X	
Time out-System 610		X	
Product #5-9 Picked		X	

[0382] Holding Controller

[0383] The other control subsystem is that dedicated to holding product at proper temperatures. Generally, a standard temperature controller with timer channels to manage all holding functions can be utilized, as is known in the art.

[0384] Table V lists the various control parameters for the holding control subsystem for food holding device 635:

TABLE V

Holding Control Signals			
Description	Input	Output	Op. Adj
Buffer Temp Set	X		X
Buffer Temp Act		X	
Pick Up Temp Set	X		X
Pick Up Temp Act		X	
Apron Temp Set	X		X
Apron Temp Act		X	
Holding Temp Set	X		X
Holding Temp Act		X	
Holding Time #1 Start	X		
Holding Time #1 End	X		
Holding Time #2 Start	X		
Holding Time #1 End	X		

[0385] Touch-Screen Monitor

[0386] The Touch-Screen Monitor is the primary system user interface and can be considered part of the Master

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Controller configuration. The Monitor has four main functions: (1) display the status of fried foods orders; (2) allow the operator to manually control the system; (3) alert the operator to any needed manual intervention; and (4) allow the operator to reconfigure the workstation and/or change the individual operating parameters

[0387] The Monitor display can be configured as desired. Preferably, the main display menu is simple, uncluttered and only presents the basic information needed to track ongoing order status. A sample Monitor display layout is shown in FIG. 72

[0388] In the illustrated embodiment, products on order would appear as horizontal rows of the appropriate product (type and portion size) icon, reading from the left edge of the screen. All products from a single POS customer order would appear on a single line. As additional POS orders are entered, the screen would refresh, moving the older orders down a line. Products on order, and not yet ready for pick up would appear as gold icons.

[0389] Across the bottom of the screen would appear the same number of locations as there are packaging device 600 receptacles 612 in the pick up zone. As packages of fries are placed on receptacles 612 and the receptacles 612 travel within the pick up zone, the appropriate icon will disappear from the "on order" line and reappear as a green icon in the spot where its receptacle is. When a package is removed from a receptacle and that receptacle passes return gate 928, the display icon will disappear from the screen

[0390] In one embodiment, should the "hold timer" for a packaged product expire before it is picked up, its green icon will change color (i.e., to red) and/or flash. In another embodiment, an audible alarm can be provided as well, indicating clearly that this product should be wasted

[0391] Across the top of the screen is a line of control "buttons." There can be one for each product (again, type and portion size). The system is programmed so that touching the button on the screen will enter an order for one each of that product. There is also a screen button at the upper right corner of the screen that enables the operator to change the screen display to the "Settings" screen

[0392] The "Settings" screen layout is depicted in FIG. 73. From this screen, the operator may now configure all the operating settings for the product to be run in each product lane. The individual settings may include dispensing load size(s), fry vat temperature, cooking cycle time, buffer inventory level, packaging device Module heater setting, and other settings as desired. In this embodiment, all settings for a particular product are linked to that product. The operator can merely scroll in each product lane and signify the product that will be run in it. Master Controller 110 will then set all operating parameters for that product. If it is necessary to check or adjust an individual control setting (such as cook time), the operator can scroll through the items in the "settings" box for that lane and product. Then, using the "up" and "down" keys, readjust the setting and press the "enter" key to reset

[0393] If required, a secure "manager only screen" can be configured to allow someone to adjust and/or reset selected operating parameters. Access to this screen and these settings would require some type of password to prevent any non-authorized store employee from changing basic system parameters

[0394] Operator alert messages or alarms (e.g., bulk product low—refill now; "bridging/time out"—clear lane 2; etc.) will appear as an "error message box" in the center of the screen, along with some type of audible alarm

[0395] While the invention has been described with respect to certain preferred embodiments, as will be appreciated by those skilled in the art, it is to be understood that the invention is capable of numerous changes, modifications and rearrangements and such changes, modifications and rearrangements are intended to be covered by the following claims

1. An automated modular system for dispensing, frying and packaging food into individual portion-sized containers comprising:

an automated dispensing module capable of dispensing a desired quantity of food to be fried;

an automated fry module adjacent the dispensing module to receive and fry the quantity of food dispensed from the dispensing module, and to produce and dispense a quantity of fried food;

an automated packaging module adjacent the fry module to receive and package the fried food from the fry module into an individual portion-sized container

2. The automated modular system of claim 1 wherein the three modules are independent from each other and can be operated independently

3. The automated modular system of claim 2 wherein any one of the modules can be deactivated and a human operator can manually perform the function of the deactivated module with manually operated equipment

4. The automated modular system of claim 1 further comprising an automated seasoning device to put seasoning on the food

5. The automated modular system of claim 1 wherein said dispensing module is capable of dispensing one or more of French fries, chicken nuggets, hash browns, chicken patties and fish filets

6. The automated modular system of claim 1 wherein said automated dispensing module comprises:

a freezer;

a storage container located in the freezer for containing food to be dispensed;

means for dispensing a predetermined quantity of food from the storage container into a secondary container, said means for dispensing and said secondary container located in the freezer; and

means for dispensing the quantity of food from the secondary container to a location outside of the freezer.

7. The automated modular system of claim 1 wherein said fry module comprises:

(a) a fry vat for containing and heating cooking oil;

(b) at least one circular fry wheel having at least a generally circular perimeter and a plurality of compartments, each compartment having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel, which radial axis is disposed above the normal operating level of the frying oil in the fry vat; and

(c) a drive mechanism for rotating the fry wheel.

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8. The automated modular system of claim 7 further comprising a control system for causing the drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of angular rotation to simulate shaking of a fry basket

9. The automated modular system of claim 6 wherein said fry module comprises:

- (a) a fry vat for containing and heating cooking oil;
- (b) at least one circular fry wheel having at least a generally circular perimeter and a plurality of compartments each having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the wheel which radial axis is disposed above the normal operating level of the frying oil in the fry vat; and

- (c) a drive mechanism for rotating the fry wheel

10. The automated modular system of claim 1 wherein said automated packaging module comprises:

- a rotatable food dispensing member having an inlet location to receive a quantity of cooked food and a discharge location to discharge cooked food;
- a food dispensing chute positioned to receive cooked food from the discharge location of the rotatable food dispenser, said food dispensing chute having a discharge location

11. The automated modular system of claim 6 wherein said automated packaging module comprises:

- a rotatable food dispensing member having an inlet location to receive a quantity of cooked food and a discharge location to discharge cooked food;
- a food dispensing chute positioned to receive cooked food from the discharge location of the rotatable food dispenser, said food dispensing chute having a discharge location

12. The automated modular system of claim 9 wherein said automated packaging module comprises:

- a rotatable food dispensing member having an inlet location to receive a quantity of cooked food and a discharge location to discharge cooked food;
- a food dispensing chute positioned to receive cooked food from the discharge location of the rotatable food dispenser, said food dispensing chute having a discharge location

13. The automated modular system of claim 10 further comprising a carton holding device for holding the individual portion-sized food carton in position to receive food from the discharge location of the dispensing chute

14. The automated modular system of claim 13 further comprises a rotatable food collecting member disposed to collect food dispensed from the discharge location of the dispensing chute that are not deposited into the individual portion-sized food container

15. The automated modular system of claim 1 further comprising a food carton holding device for holding the individual portion-sized food carton in position to receive food from the discharge location of the dispensing chute

16. The automated modular system of claim 15 further comprising a conveyor system for transporting filled individual portion-sized food containers from adjacent the filling location to a filled food container holding area

17. The automated modular system of claim 1 wherein said automated packaging device comprises:

- a rotatable food dispensing member having an inlet location to receive a quantity of cooked food and a discharge location to discharge cooked food;
- a food dispensing chute positioned to receive cooked food from the discharge location of the rotatable food dispenser, said food dispensing chute having a discharge location, wherein said dispensing chute has a food holding area for holding a quantity of cooked food deposited therein; and

the automated device further comprising an automated food carton retrieving device for retrieving and grasping an individual portion-sized food container

18. The automated modular system of claim 17 wherein said automated retrieving device comprises a moveable member for selectively grasping and releasing the food container

19. The automated modular system of claim 18 wherein said retrieving device is capable of grasping and releasing an unerected food container on one side and further comprising a second device for selectively grasping the unerected food container on the other side and means for moving the retrieving device and the second device relatively apart when grasping the sides of the container to erect the container

20. The automated modular system of claim 19 wherein the container has a bottom and further comprising automated urging means for urging the container bottom upwardly relative to the sides of the container when the retrieving device and second device are moved relatively apart when grasping the container

21. The automated modular system of claim 1 further comprising an electronic control system for coordinating the operation of said three modules

22. The automated modular system of claim 21 wherein said electronic control system receives current customer order information and said electronic control system causes the selection from a plurality of different sizes and filling with food of the ordered size of food container in response to a customer order

23. The automated modular system of claim 21 wherein the electronic control system receives customer order information and controls the dispensing rate of food dispensed from the food dispensing module to the fry module which dispensing automatically determines the amount of food being fried without further intervention by said electronic control

24. An automated modular system for dispensing, frying and packaging French fries into individual portion-sized containers comprising:

- an automated dispensing module capable of dispensing a desired quantity portion of French fries to be fried;
- an automated fry module adjacent the dispensing module to receive the French fries dispensed from the dispensing module;
- an automated packaging module adjacent the fry module to receive and package the French fries into individual portion-sized containers

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25. The automated modular system of claim 24 further comprising an electronic control system for coordinating the operation of said three modules.

26. The automated modular system of claim 25 wherein said electronic control system receives current customer order information and said electronic control system causes the selection from a plurality of different sizes and filling with French fries of the ordered size of French fry container in response to a customer order.

27. The automated modular system of claim 24 wherein said automated dispensing module comprises:

a freezer;

a storage container located in the freezer for containing French fries to be dispensed;

means for dispensing a predetermined quantity of French fries from the storage container into a secondary container, said means for dispensing located in the freezer; and

means for dispensing the quantity of French fries from the secondary container to a location outside of the freezer.

28. The automated modular system of claim 24 wherein said fry module comprises:

(a) a fry vat for containing and heating cooking oil;

(b) at least one circular fry wheel having at least a generally circular perimeter and a plurality of compartments each having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the wheel which radial axis is disposed above the normal operating level of the frying oil in the fry vat; and

(c) a drive mechanism for rotating the fry wheel.

29. The automated modular system of claim 24 wherein said automated packaging module comprises:

a rotatable French fry dispensing member having an inlet location to receive a quantity of cooked French fries and a discharge location to discharge cooked French fries;

a French fry dispensing chute positioned to receive cooked French fries from the discharge location of the rotatable French fry dispenser, said French fry dispensing chute having a discharge location.

30. An automated method of dispensing, frying and packaging food into individual portion-sized containers comprising:

dispensing a desired quantity portion of food to be fried from an automated dispensing module to an automated fry module;

frying the portion of food dispensed from the dispensing module in the automated fry module adjacent the dispensing module to produce a quantity of fried food;

dispensing the quantity of fried food from the fry module to a packaging module;

packaging the fried food dispensed from the fry module into individual portion-sized containers with an automated packaging module.

31. The automated method of claim 30 further comprising seasoning the quantity of fried food with an automated seasoning device.

32. The automated method of claim 30 wherein said dispensing comprises automatically dispensing food from a storage container located in a freezer and onto a ramp that permits the food to enter the fry module.

33. The method of claim 32 wherein said dispensing comprises:

dispensing a predetermined quantity of food from the storage container into a secondary container located in the freezer and dispensing the quantity of food from the secondary container to a location outside of the freezer.

34. The automated method of claim 30 wherein said frying comprises:

rotating a fry wheel having at least a generally circular perimeter and a plurality of compartments, each compartment having an opening towards the perimeter, the food being contained in one of said compartments during said frying, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel in a fry vat, which radial axis is disposed above a normal operating level of the cooking oil in the fry vat.

35. The automated method of claim 34 further comprising controlling a drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of angular rotation to simulate shaking of a fry basket during said frying.

36. The automated method of claim 30 wherein said packaging comprises:

rotating a rotatable food dispensing member, having an inlet location to receive a quantity of cooked food and a discharge location to discharge cooked food, to dispense food into a food dispensing chute positioned to receive cooked food from the discharge location of the rotatable food dispenser;

and dispensing said food from said dispensing chute.

37. The automated method of claim 36 further comprising holding the individual portion-sized food carton in position to receive food from the dispensing chute with an automated carton holding device.

38. The automated method of claim 37 further comprising collecting food dispensed from the discharge location of the dispensing chute that are not deposited into the individual portion-sized food container with a rotatable food collecting member disposed to collect such not deposited food.

39. The automated method of claim 30 further comprising transporting filled individual portion-sized food containers from adjacent a filling location to a filled food container holding area with a conveyor system.

40. The automated method of claim 30 further comprising retrieving and grasping an individual portion-sized food container to be filled with an automated food carton retrieving device.

41. The automated method of claim 40 wherein said retrieving and grasping comprises grasping and retrieving an unerected food container on one side of the container with the retrieving device and further comprising grasping the unerected food container on the other side with a second device and moving the retrieving device and the second device relatively apart when grasping the sides of the container to erect the container.

42. The automated method of claim 40 wherein the container has a bottom and the method further comprises urging the container bottom upwardly relative to the sides of

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the container when the retrieving device and second device are moved relatively apart when grasping the container.

43. The automated method of claim 30 further comprising electronically coordinating the operation of said three modules with an electronic control system.

44. The automated method of claim 43 further comprising electronically receiving current customer order information by said electronic control system which causes selection of a container from a plurality of different size containers and filling the container with food of the ordered size of food container in response to a customer order by the packaging module.

45. The automated method of claim 43 further comprising electronically receiving customer order information and controlling the dispensing rate of food dispensed from the food dispensing module to the fry module which dispensing automatically determines the amount of food being fried without further intervention by said electronic control system.

46. An automated method for dispensing, frying and packaging French fries into individual portion-sized containers comprising:

dispensing a desired quantity portion of French fries to be fried with an automated dispensing device to a frying device;

frying with the frying device the French fries dispensed from the dispensing module to produce a quantity of fried French fries;

packaging the French fries into individual portion-sized containers with an automated packaging device.

47. The automated method of claim 46 further comprising coordinating the operation of said dispensing device, frying device and packaging device with an electronic control system.

48. The automated method of claim 47 further comprising electronically receiving current customer order information and causing selection of a container from a plurality of different size French fry containers and filling the container with French fries of the ordered size of French fry container in response to a customer order.

49. The automated method of claim 46 wherein said dispensing comprises:

containing French fries to be dispensed in a storage container located in an environment that is below 32° F;

dispensing a predetermined quantity of French fries from the storage container into a secondary container located in an environment that is below 32° F; and

dispensing the quantity of French fries from the secondary container to a location outside of the environment that is below 32° F.

50. The automated method of claim 46 wherein said packaging comprises:

rotating a rotatable French fry dispensing member having an inlet location to receive a quantity of cooked French fries to discharge cooked French fries into a French fry dispensing chute positioned to receive the cooked French fries; from the rotatable French fry dispenser, said French fry dispensing chute; and dispensing the French fries from the dispensing chute into an individual portion-sized French fry container.

51. An automated system for dispensing, frying and packaging French fries into individual portion-sized containers comprising:

an automated dispensing device capable of dispensing a desired quantity portion of French fries to be fried;

an automated fry module proximate the dispensing device to receive and fry the portion of French fries dispensed from the dispensing device, and to produce and dispense a quantity of fried French fries;

an automated packaging device proximate the fry device to receive and package the fried French fries from the fry device into an individual portion-sized French fry container.

52. The automated system of claim 51 wherein the three devices are independent from each other and can be operated independently.

53. The automated system of claim 52 wherein any one of the devices can be deactivated and a human operator can manually perform the function of the deactivated device with manually operated equipment.

54. The automated system of claim 51 further comprising a seasoning device to put seasoning on the French fries.

55. The automated system of claim 51 wherein said automated dispensing device comprises:

a freezer;

a storage container located in the freezer for containing frozen French fries to be dispensed;

a device for dispensing a predetermined quantity of French fries from the storage container into a secondary container, said device for dispensing and said secondary container located in the freezer; and

means for dispensing the quantity of food from the secondary container to a location outside of the freezer.

56. The automated system of claim 51 wherein said fry device comprises:

(a) a fry vat for containing and heating cooking oil;

(b) at least one circular fry wheel having at least a generally circular perimeter and a plurality of compartments each suitable for containing a plurality of French fries, each compartment having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel, which radial axis is disposed above the normal operating level of the frying oil in the fry vat; and

(c) a drive mechanism for rotating the fry wheel.

57. The automated system of claim 56 further comprising a control system for causing the drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of angular rotation to simulate shaking of a French fry basket.

58. The automated system of claim 55 wherein said fry device comprises:

(a) a fry vat for containing and heating cooking oil;

(b) at least one circular fry wheel having at least a generally circular perimeter and a plurality of compartments each suitable for containing French fries and each having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the

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radial axis of the wheel which radial axis is disposed above the normal operating level of the frying oil in the fry vat; and

(c) a drive mechanism for rotating the fry wheel.

59 The automated system of claim 55 wherein said automated packaging device comprises:

a rotatable food dispensing member located downstream of said fry device having an inlet location to receive a quantity of cooked French fries after frying in said fry device and a discharge location to discharge cooked French fries;

a French fry dispensing chute positioned to receive cooked French fries from the discharge location of the rotatable food dispenser, said food dispensing chute having a discharge location

60 The automated system of claim 51 wherein said automated packaging device comprises:

a rotatable food dispensing member having an inlet location to receive a quantity of cooked French fries and a discharge location to discharge cooked food;

a French fry dispensing chute positioned to receive cooked French fries from the discharge location of the rotatable French fry dispenser, said French fry dispensing chute having a discharge location

61 The automated system of claim 59 further comprising a French fry carton holding device for holding the individual portion-sized French fry carton in position to receive French fries from the discharge location of the dispensing chute

62 The automated system of claim 61 further comprises a rotatable French fry collecting member disposed to collect French fries dispensed from the discharge location of the dispensing chute that are not deposited into the individual portion-sized French fry container

63 An automated method of frying food in a fry vat having a heated cooking oil contained therein and packaging the fried food comprising:

depositing from an automated food dispenser a quantity of food to be fried into one compartment of a circular fry wheel having at least a generally circular perimeter and a plurality of compartments each having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel;

rotating the fry wheel so that the compartment having food therein travels through the heated cooking oil over a period of time to cause the food to be fried;

rotating the fry wheel to cause fried food to be discharged from one of the compartments;

directing the fried food that is discharged from one of the compartments into an automated packaging device; and

operating the automated packaging device to package the fried food into a plurality of individual portion-sized containers

64 The method of claim 63 wherein said depositing from an automated food dispenser a quantity of food comprises depositing a quantity of French fries

65 The method of claim 64 further comprising salting the food with an automated salting device

66 The method of claim 63 further comprising placing each individual portion-sized container having food contained therein into a separate individual French fry container receptacle

67 The method of claim 66 further comprising transporting the individual receptacle to a desired location

68 The method of claim 67 wherein said transporting comprises transporting by a magnetic conveyor

69 An automated device for frying food and packaging the fried food in a food carton comprising:

a fry module;

a packaging module adjacent said fry module;

said fry module composed of a fry vat for containing and heating cooking oil, a container for containing food that is moveable through the heated cooking oil for a period of time sufficient to cook the food contained therein and then out of the cooking oil and a drive mechanism for moving the container through the cooking oil and means for discharging the food from the container after frying and to the packaging module;

said packaging module comprising a rotatable food dispensing member having an inlet location to receive a quantity of fried food and a discharge to discharge the cooked food, a cooked food dispensing chute to receive cooked food from the discharge of the rotatable food dispensing member and a food dispensing chute positioned to receive fried food from the discharge of the rotatable fried food dispenser, the food dispensing chute having a discharge location

70 The automated device of claim 69 further comprising a weighing device associated with said dispensing chute to weigh food that is in the dispensing chute

71 The automated device of claim 69 further comprising an automated food carton holding device for holding the food container in a receiving position to receive fried food from the discharge location of said dispensing chute

72 The automated device of claim 71 wherein said automated food carton holding device is capable of placing the carton containing food at a second location different from the receiving position

73 The automated device of claim 72 further comprising a conveyor to move the carton from the second location to a desired location

74 The automated device of claim 69 further comprising a dispensing module, located adjacent the fry module, for dispensing a desired portion of food to be fried into the container of said fry module

75 The automated device of claim 69 further comprising a hood structure located over said fry module

76 The automated device of claim 75 wherein said hood structure comprises an air filter located at an air exit of said hood structure and a drip pan to collect cooking oil from the filter, the drip pan located below the filter

77 An automated system for dispensing, frying and storing cooked food comprising:

an automated dispensing device capable of dispensing a desired quantity portion of food to be cooked;

an automated fry module proximate the dispensing device to directly receive and fry the portion of food dispensed from the dispensing device, and to produce and dispense a quantity of fried French fries;

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a food receiving device proximate the fry device to directly receive and store the cooked food received from the fry device

78. The automated system of claim 77 wherein said automated dispensing device comprises:

a freezer;

a storage container located in the freezer for containing frozen food to be dispensed;

a device for dispensing a predetermined quantity of French fries from the storage container into a secondary container, said device for dispensing and said secondary container located in the freezer; and

means for dispensing the quantity of food from the secondary container to a location outside of the freezer.

79. The automated system of claim 77 wherein said fry device comprises:

(a) a fry vat for containing and heating cooking oil;

(b) at least one circular fry wheel having at least a generally circular perimeter and a plurality of compartments each suitable for containing a plurality of French

fries, each compartment having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel, which radial axis is disposed above the normal operating level of the frying oil in the fry vat; and

(c) a drive mechanism for rotating the fry wheel

80. The automated system of claim 79 further comprising a control system for causing the drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of angular rotation to simulate shaking of a French fry basket

81. The automated device of claim 77 wherein said food receiving device is heated.

82. The automated device of claim 81 wherein said food receiving device comprises a heated holding bin positioned to receive food from an outlet slide located between the fry module and the food receiving device.

83. The automated system of claim 82 wherein said holding bin comprises four heated sides and a heated bottom

* * * * *

EXHIBIT O



US 20030205027A1

(19) **United States**(12) **Patent Application Publication** (10) Pub. No.: **US 2003/0205027 A1**
Sus et al. (43) Pub. Date: **Nov. 6, 2003**(54) **AUTOMATED METHOD FOR PACKAGING FOOD****Publication Classification**(51) Int. Cl.⁷ **B65B 1/22; B65B 1/32**(52) U.S. Cl. **53/437; 53/440; 53/473; 53/502; 53/458**(76) Inventors: **Gerald A. Sus, Frankfort, IL (US); Ron Dorsten, Oak Park, IL (US); Jenny Hong, Palatine, IL (US); Glenn Schackmuth, Montgomery, IL (US); Andrew Courier, Mansfield, MA (US); Kevin Keough, Canton, MA (US); Richard Terrazzano, Salem, NH (US); Mario G. Ceste, Wallingford, CT (US); Curtis Clarence Pinnow, Libertyville, IL (US); Christopher Juneau, Hayward, CA (US); Steven Konold, Hayward, CA (US); Richard Montafi, Daly City, CA (US); Benny Nunley, Half Moon Bay, CA (US); Charles E. Rose, Hayward, CA (US)**(57) **ABSTRACT**

An automated food processing system and method is provided that allows food to be dispensed, fried and packaged in a suitable container, which may be an individual portion-sized container. In one embodiment, the system includes separate automated modules for dispensing, frying and packaging the food.

In one embodiment, an automated dispensing device dispenses a predetermined portion of food from a bulk storage container or food dispensing magazine. Food is dispensed from the automated dispensing device to an automated fry device that can include at least one circular fry wheel having a plurality of food containing compartments. After the food is fried it is dispensed from the fry device to an automated packaging device. The automated packaging device dispenses food to a container that may be an individual portion-sized container that is retrieved, erected and held into position for filling by an automated container handling system. After a food container is filled, a conveyor system transports the filled container to a suitable pick-up location.

Correspondence Address:

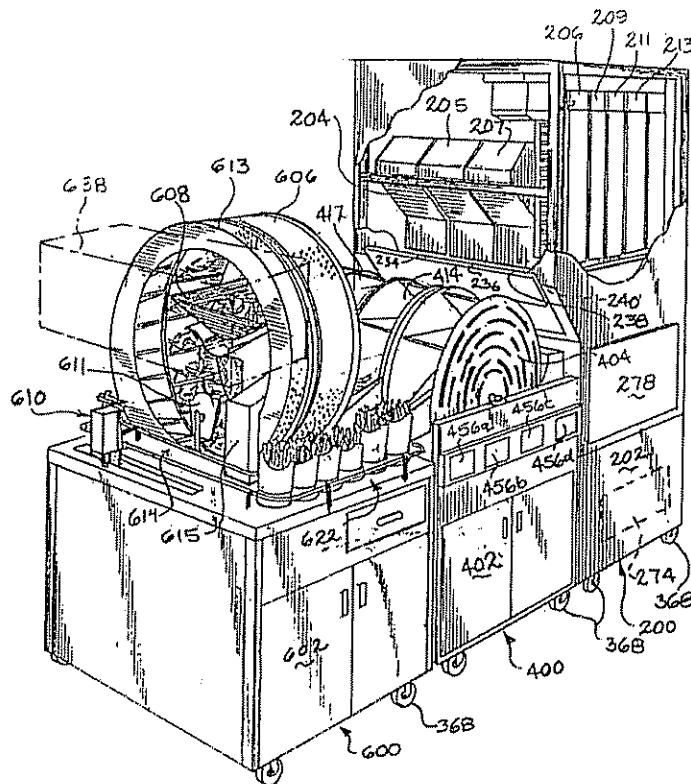
RYNDAK & SURI**30 N. LaSalle Street, Suite 2630****Chicago, IL 60602 (US)**(21) Appl No: **10/127,202**(22) Filed: **Apr. 22, 2002**

FIG. 1

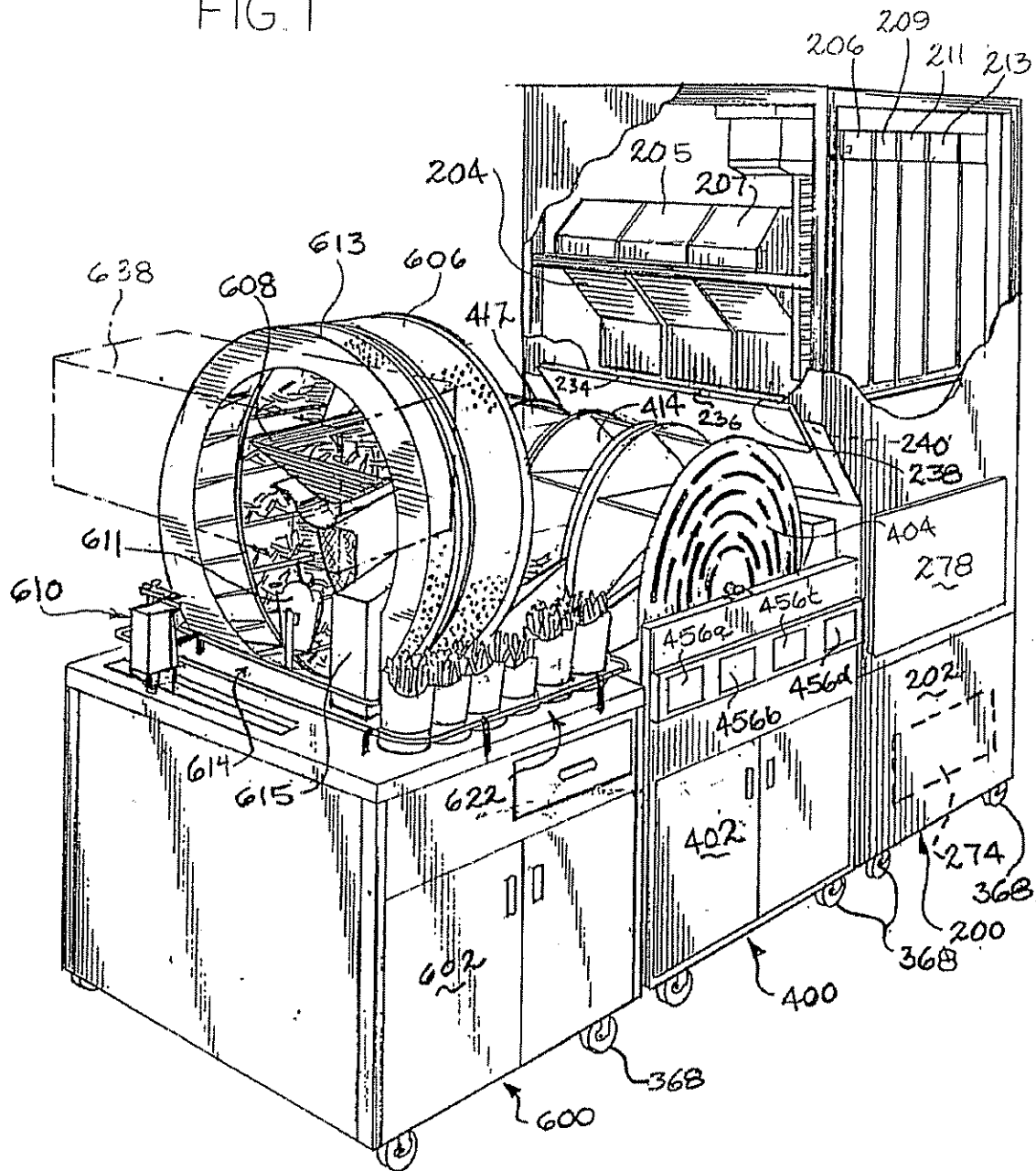
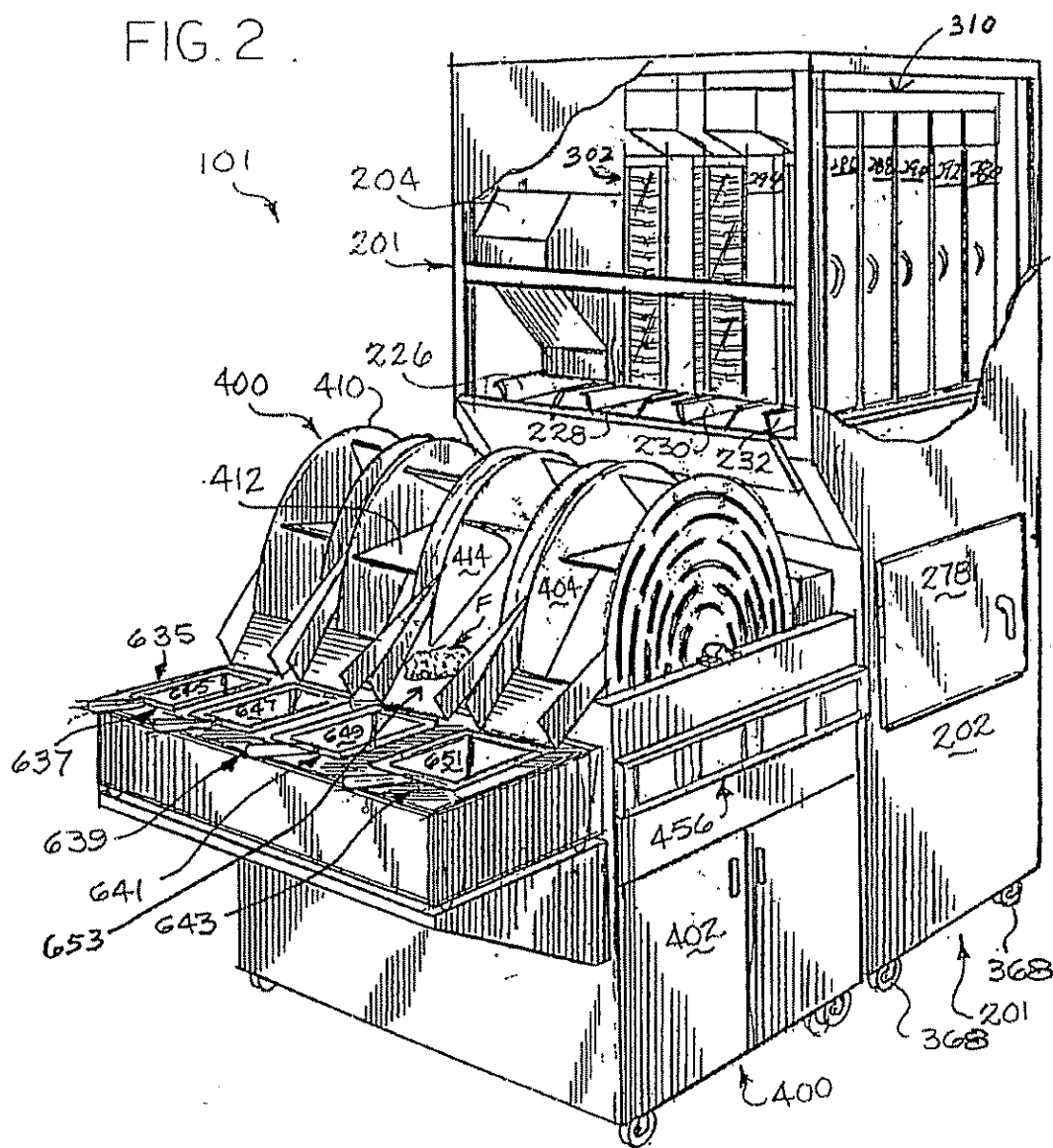


FIG. 2



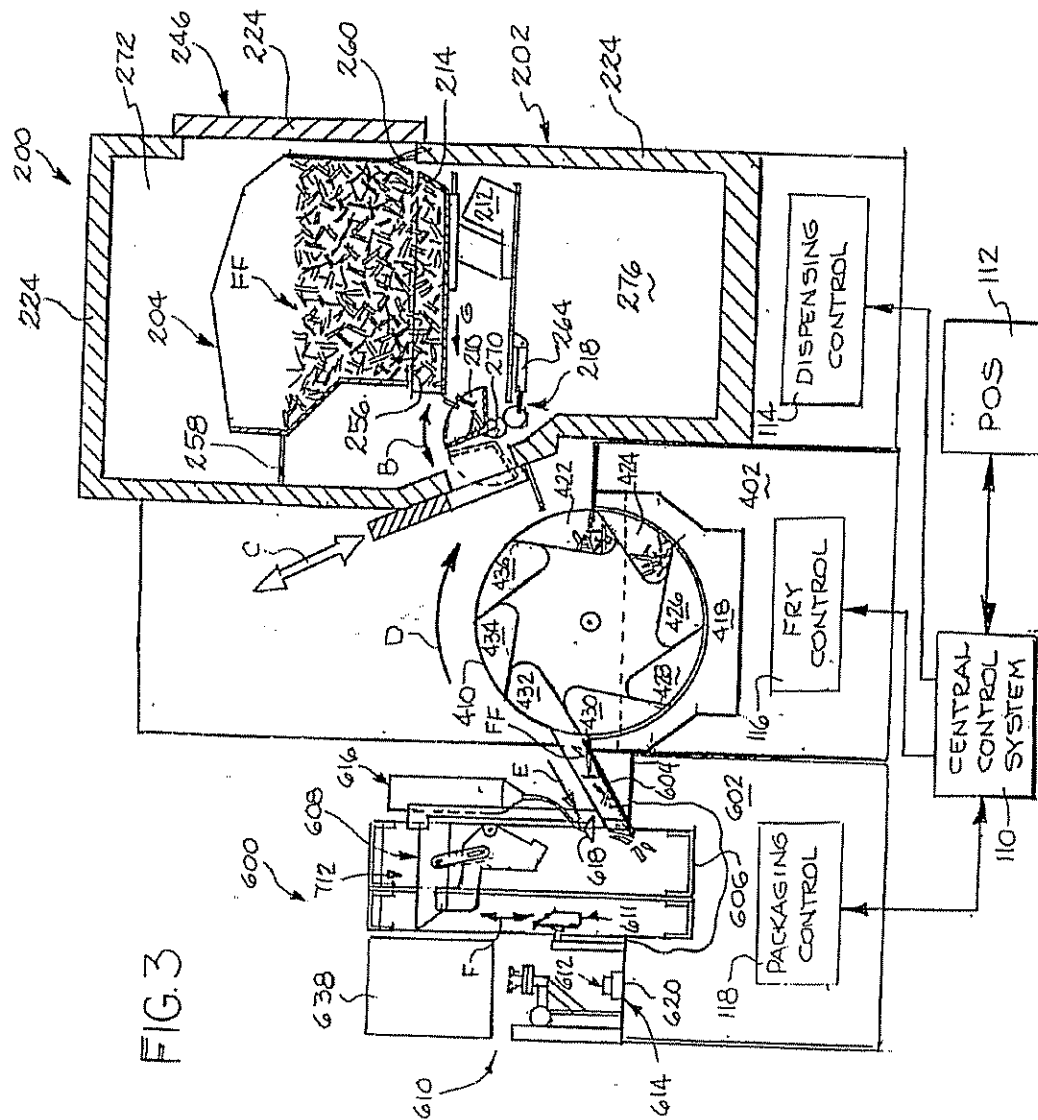


FIG. 4

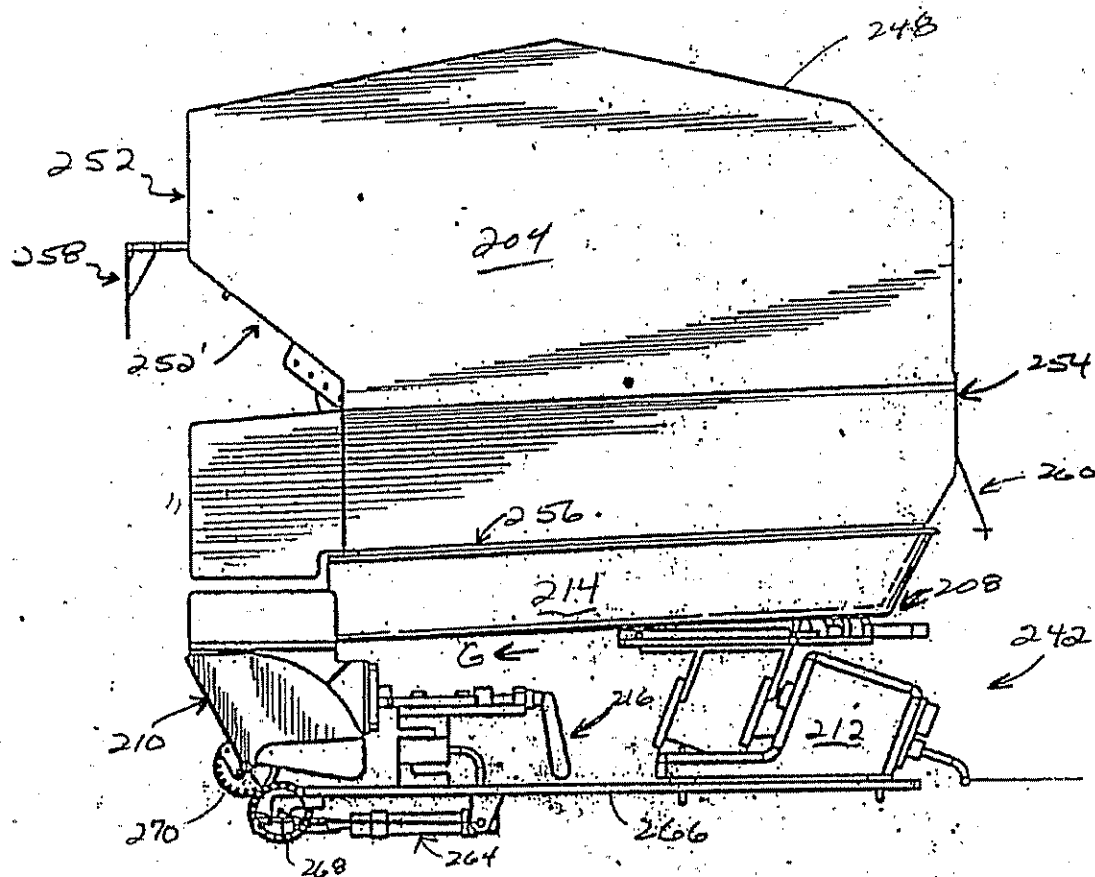


FIG. 4A

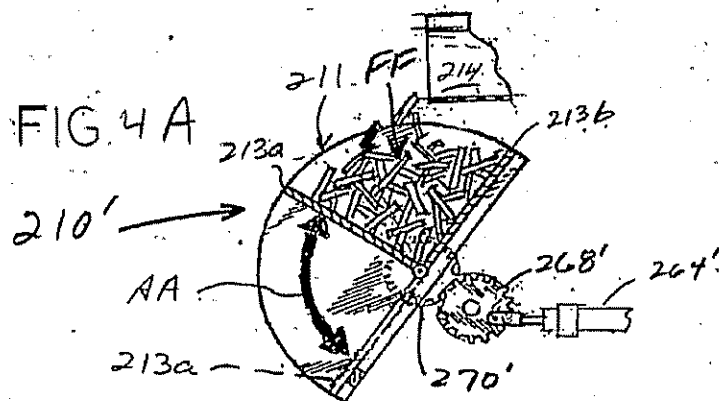
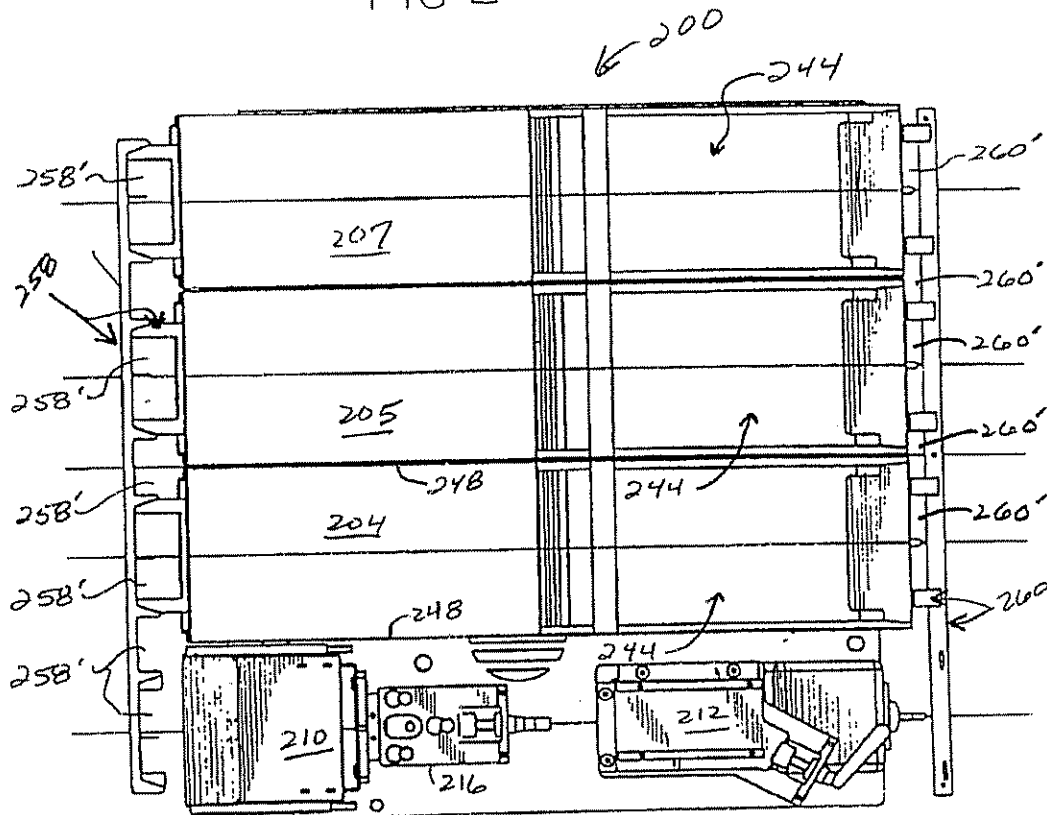
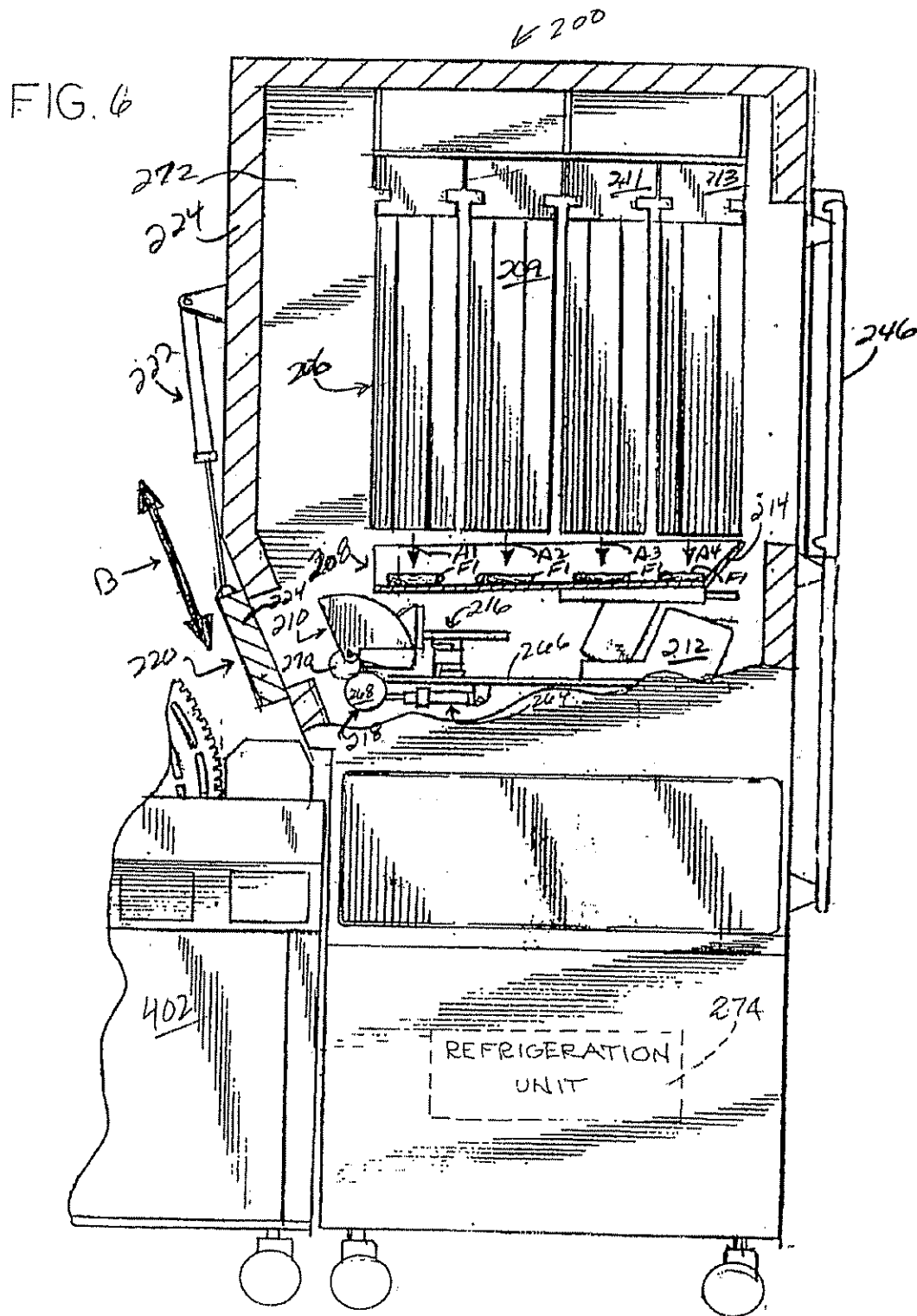
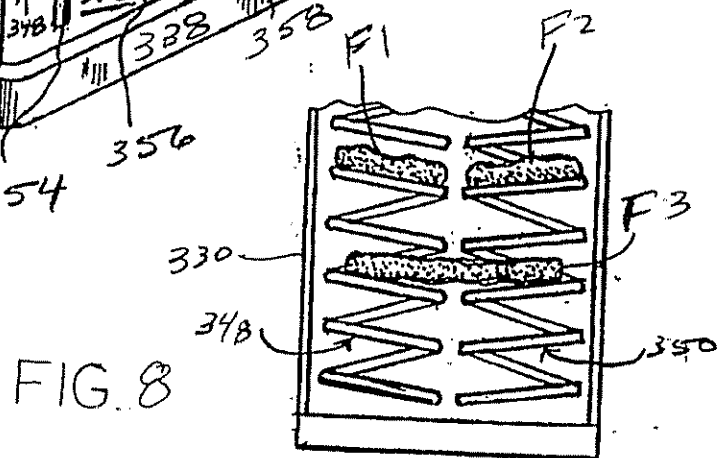
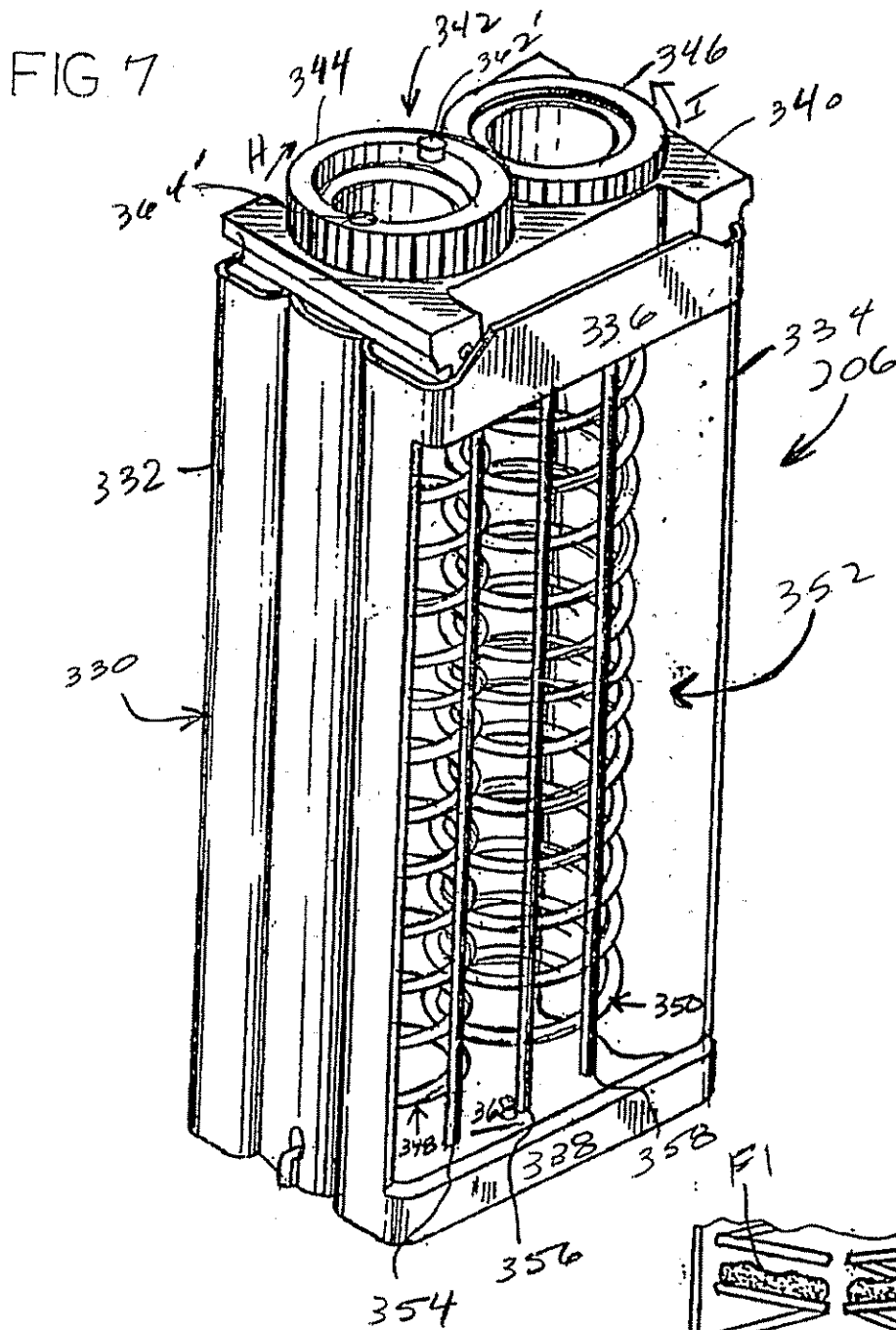


FIG 5







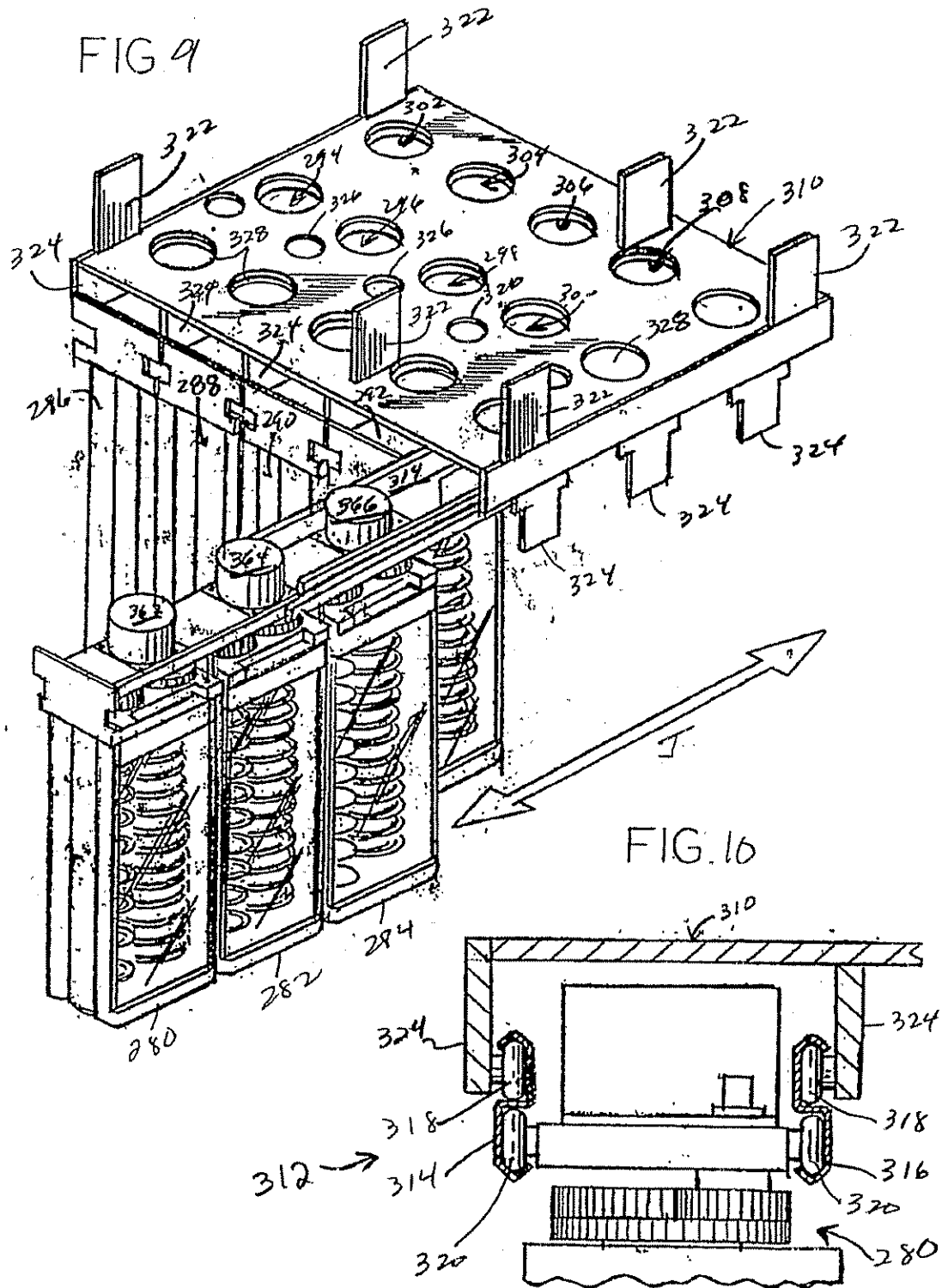


FIG. 11

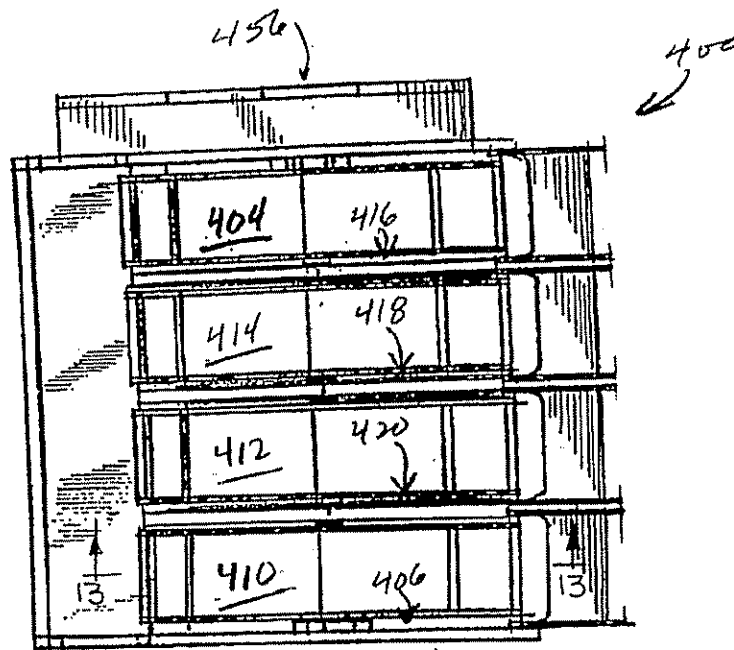
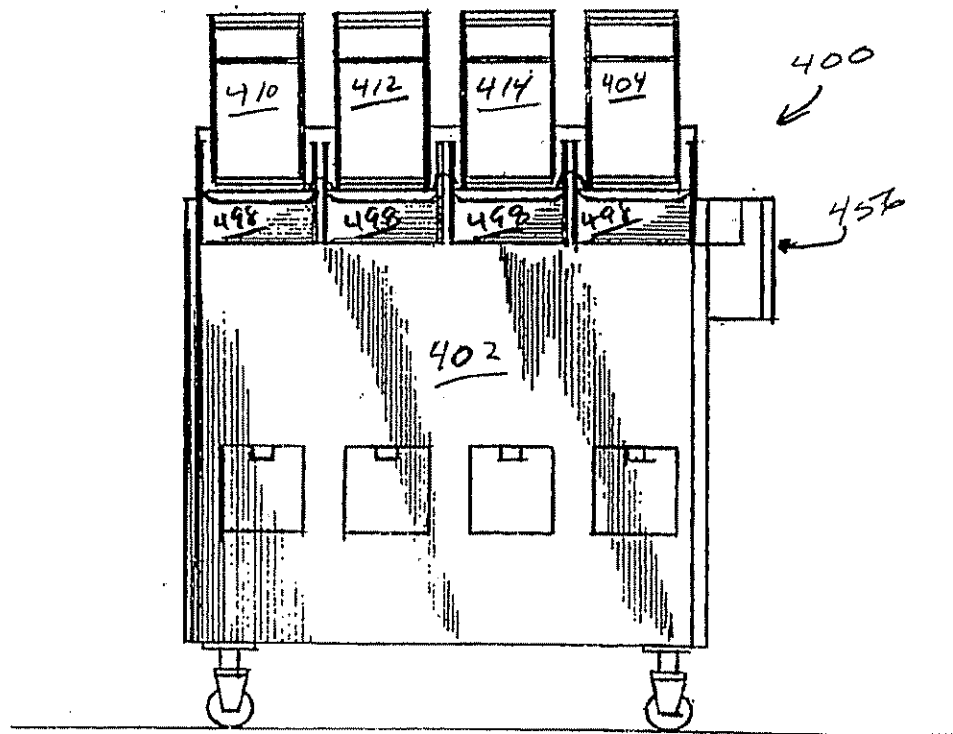
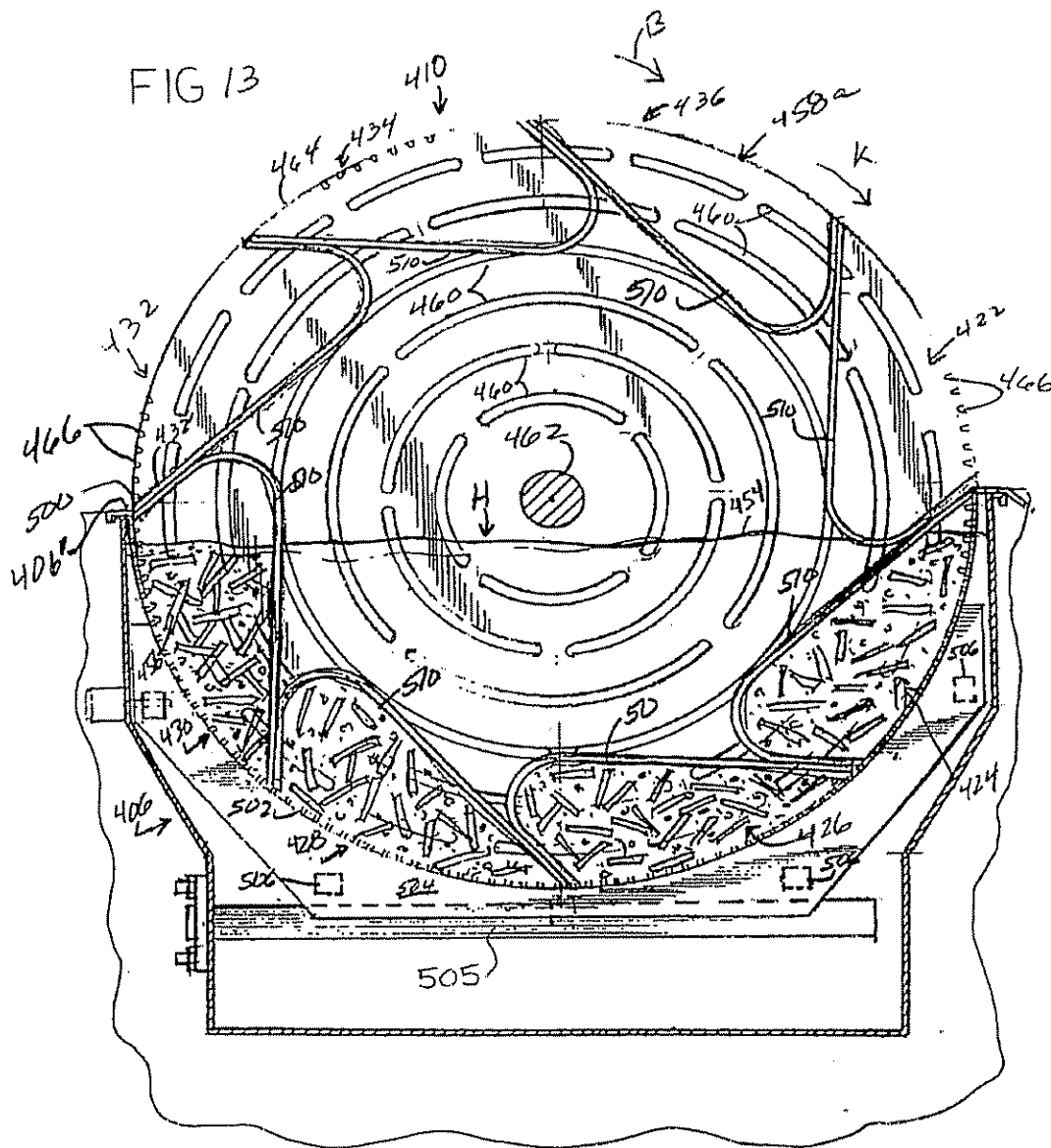
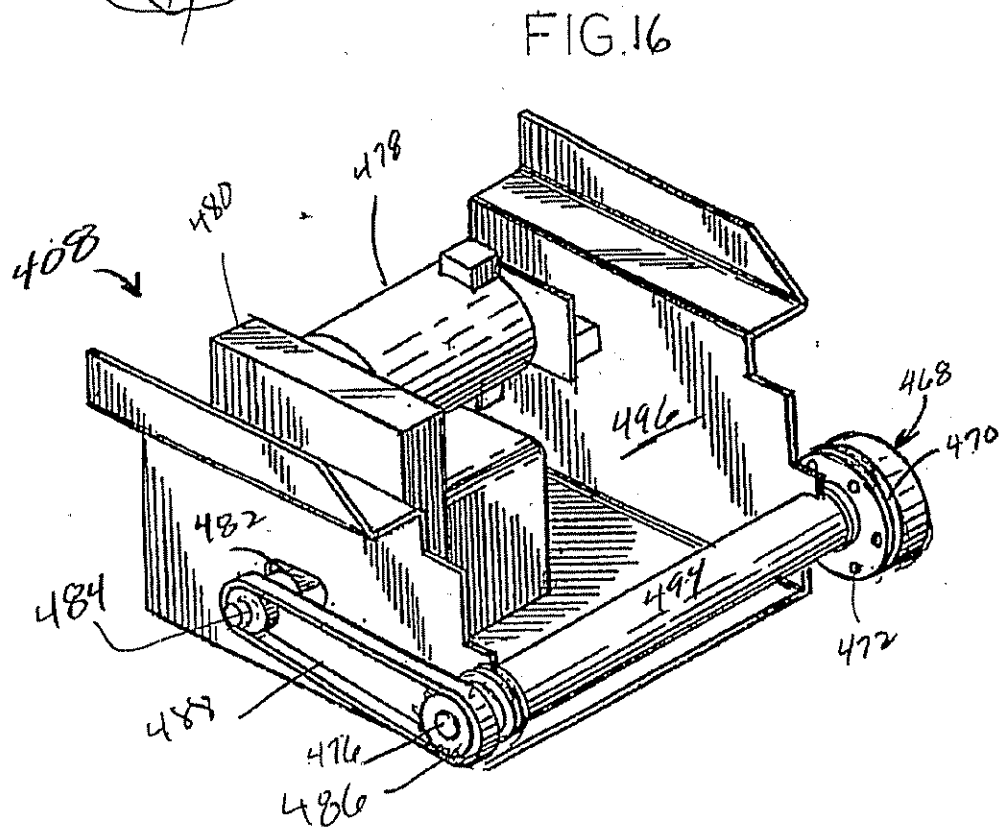
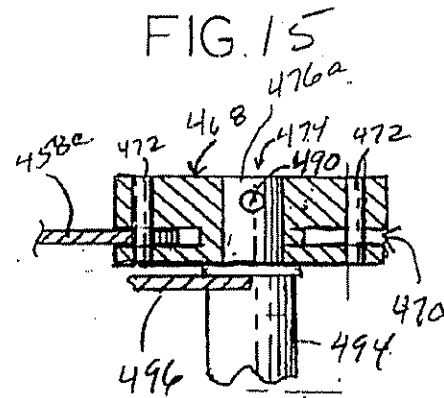
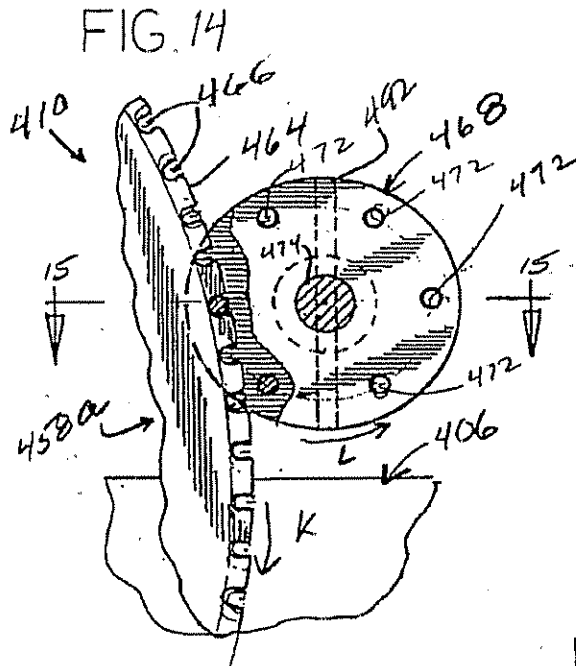
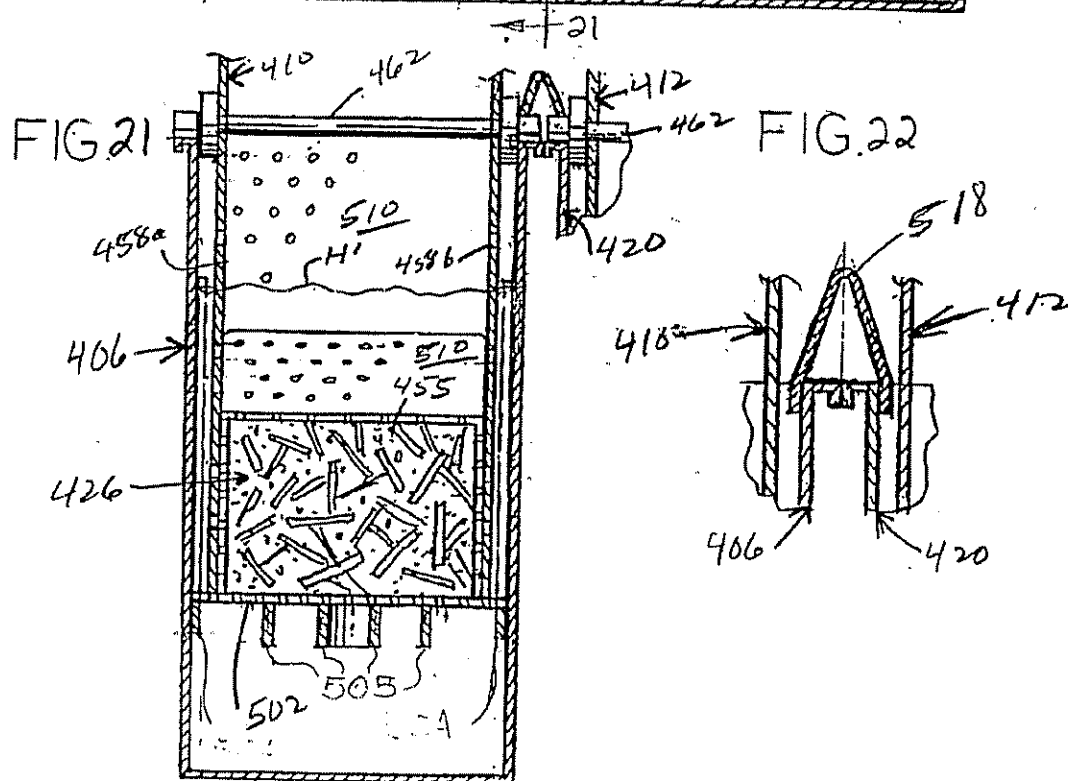
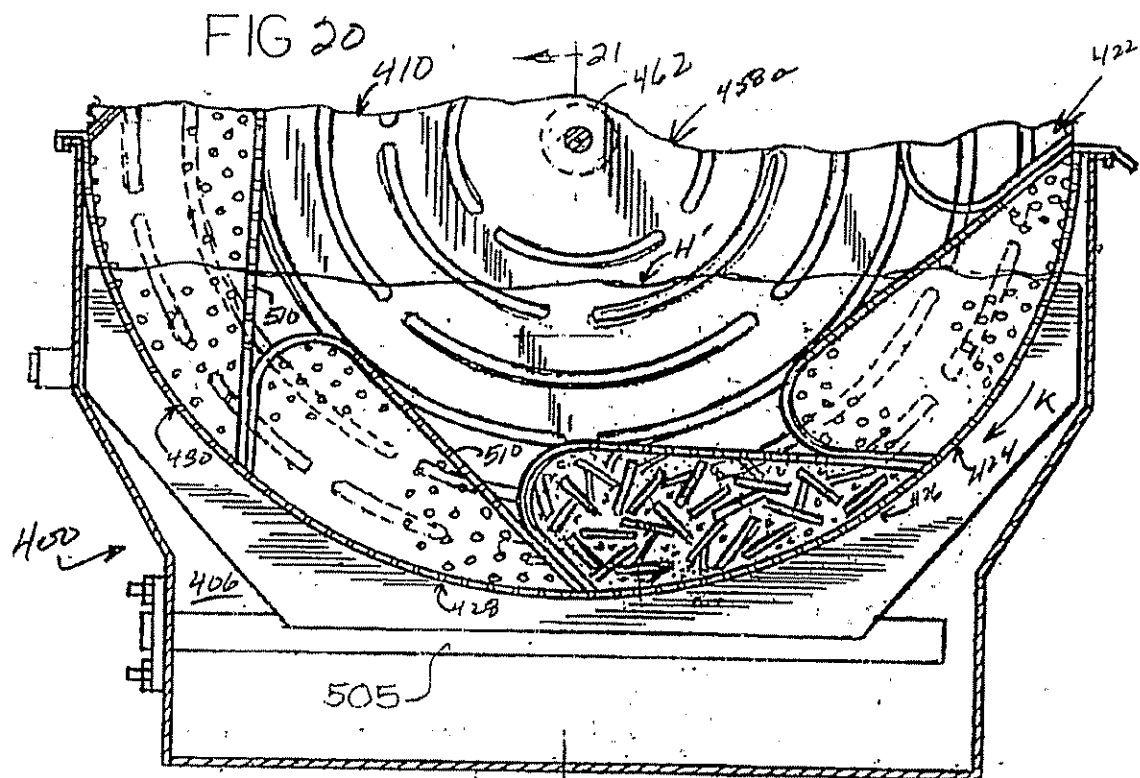


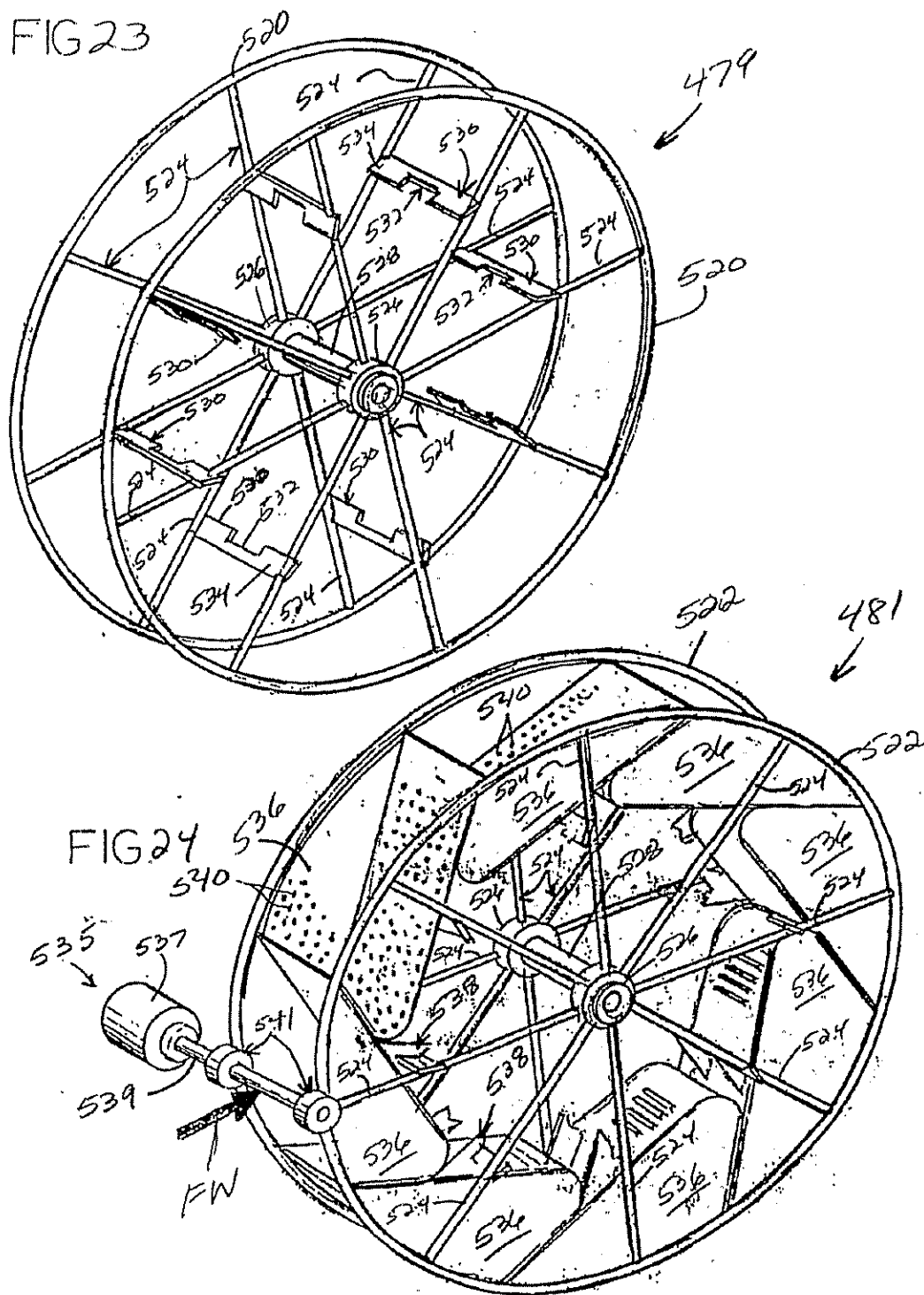
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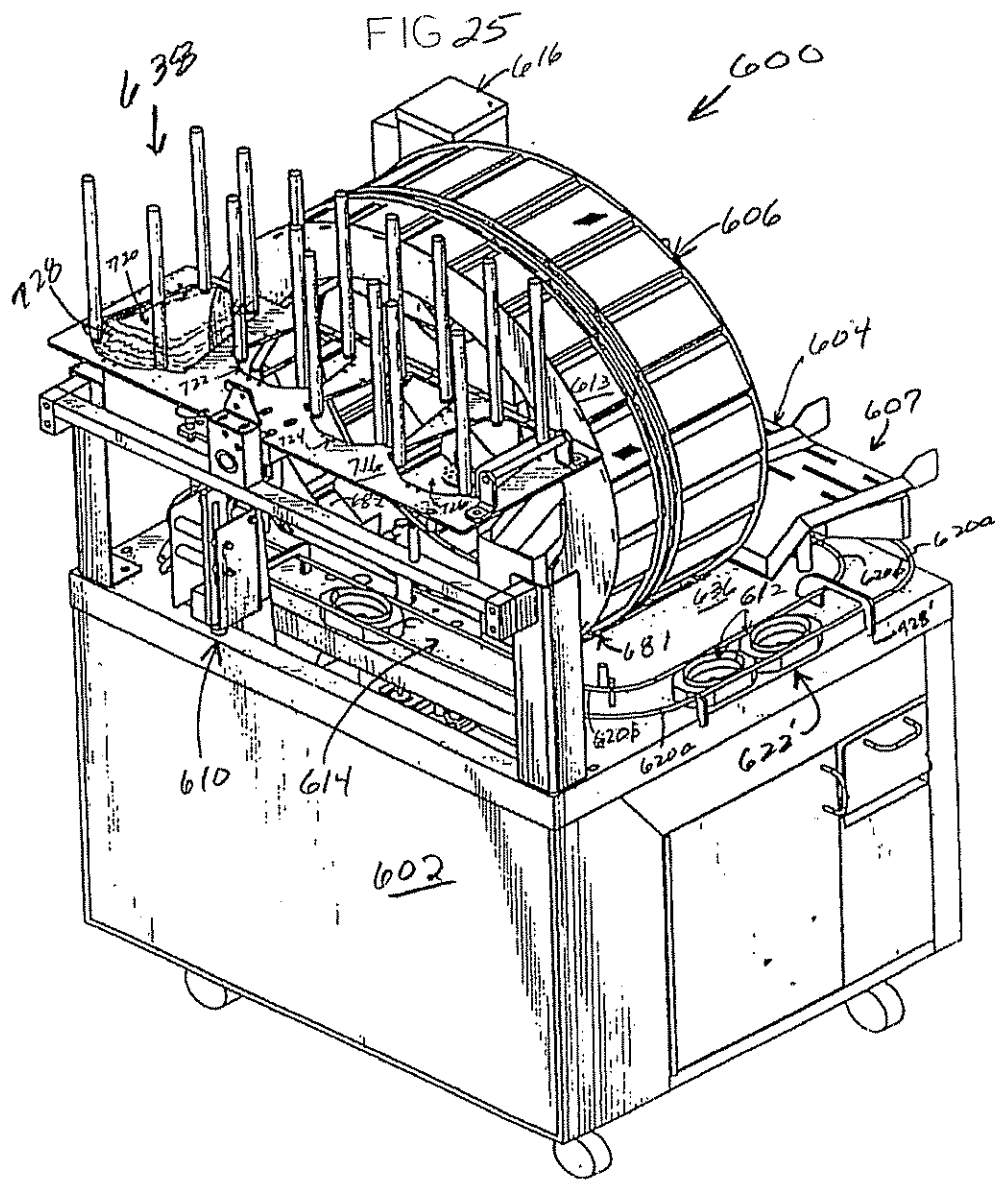


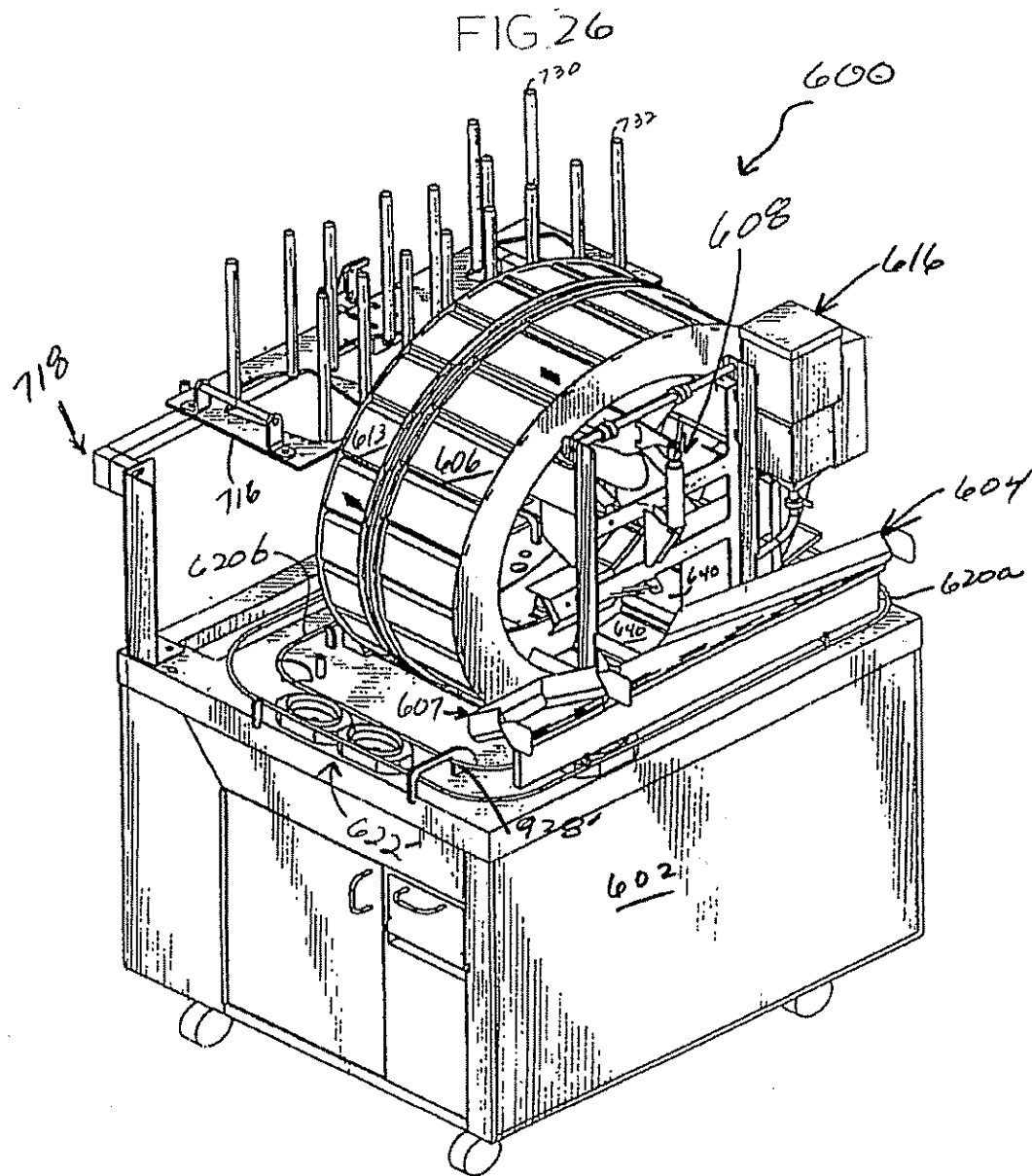


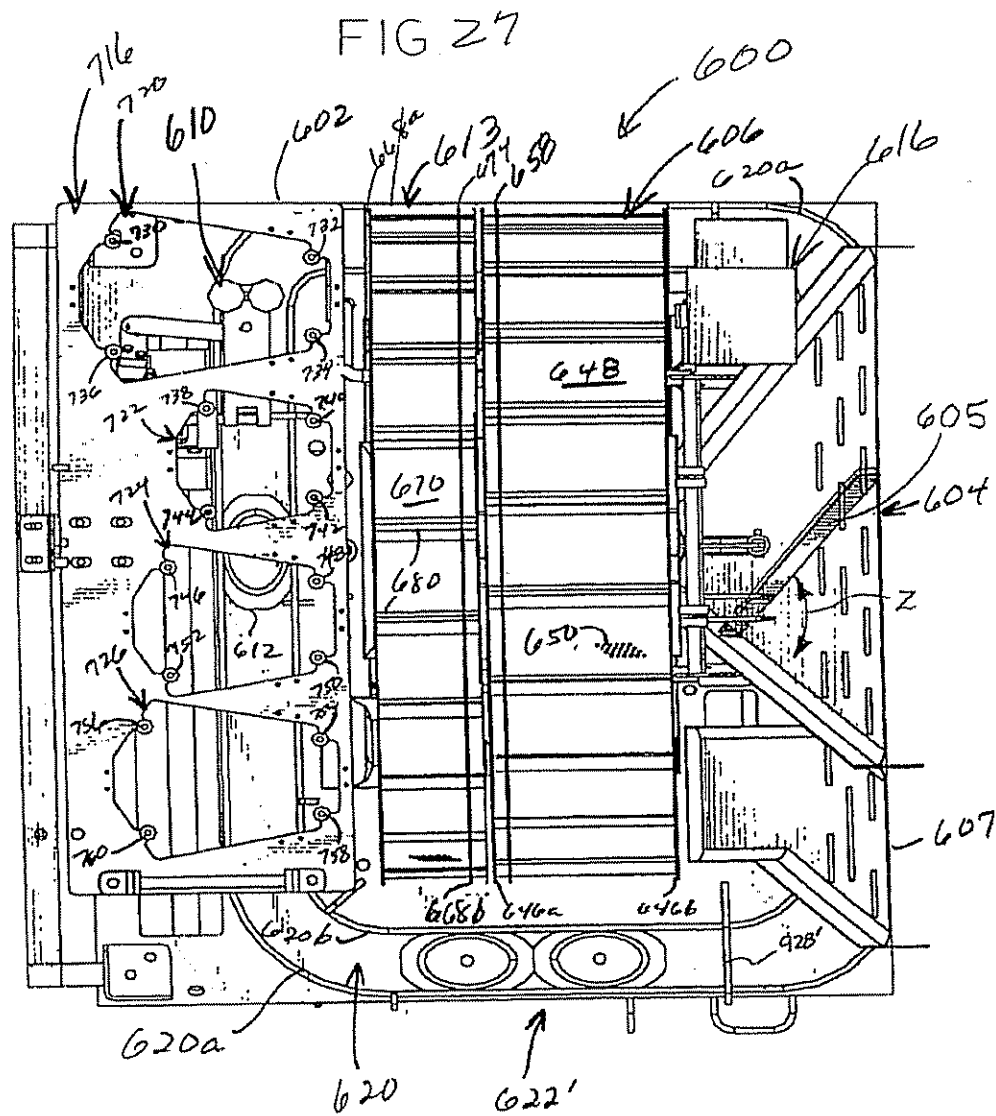


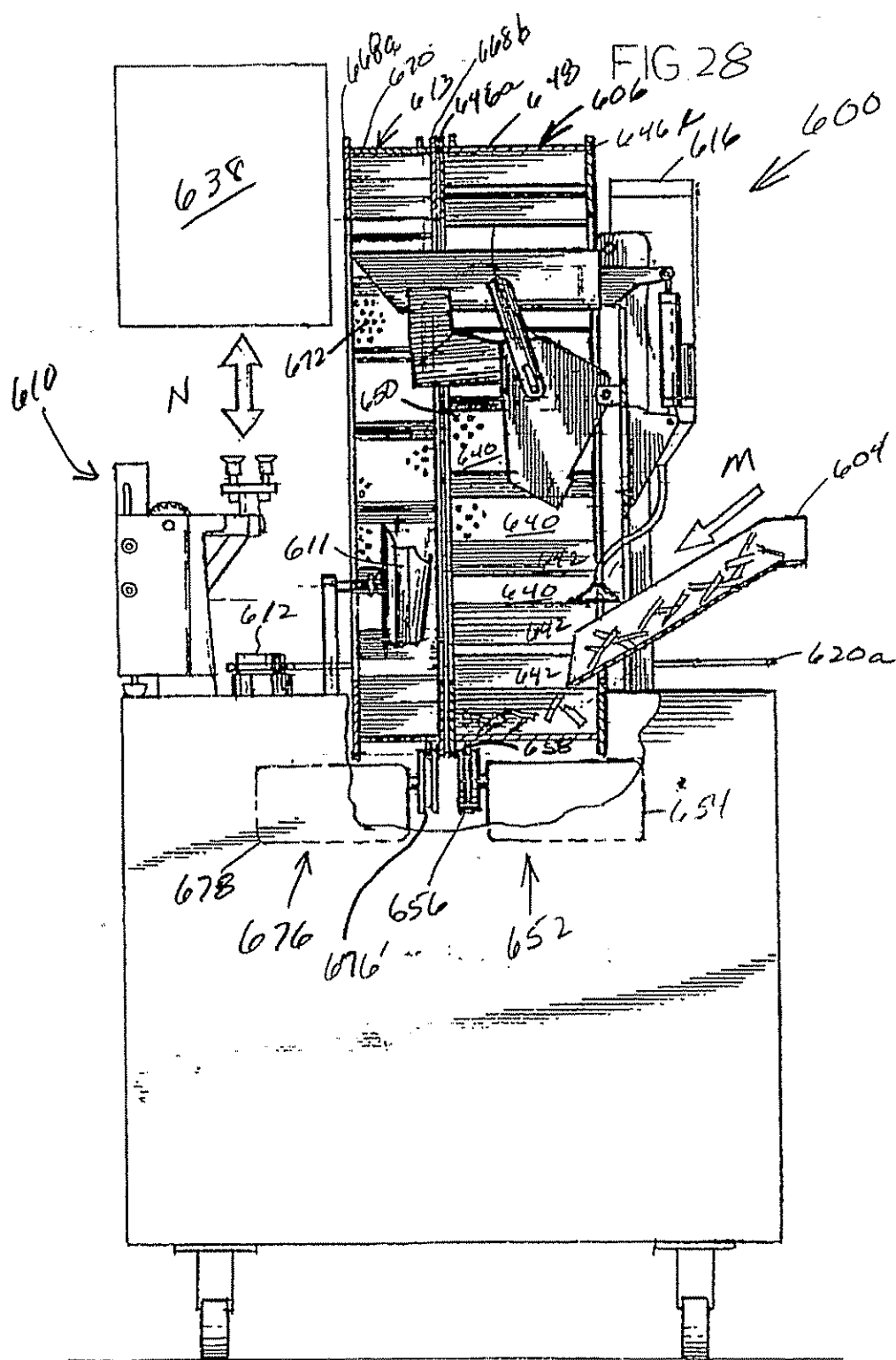


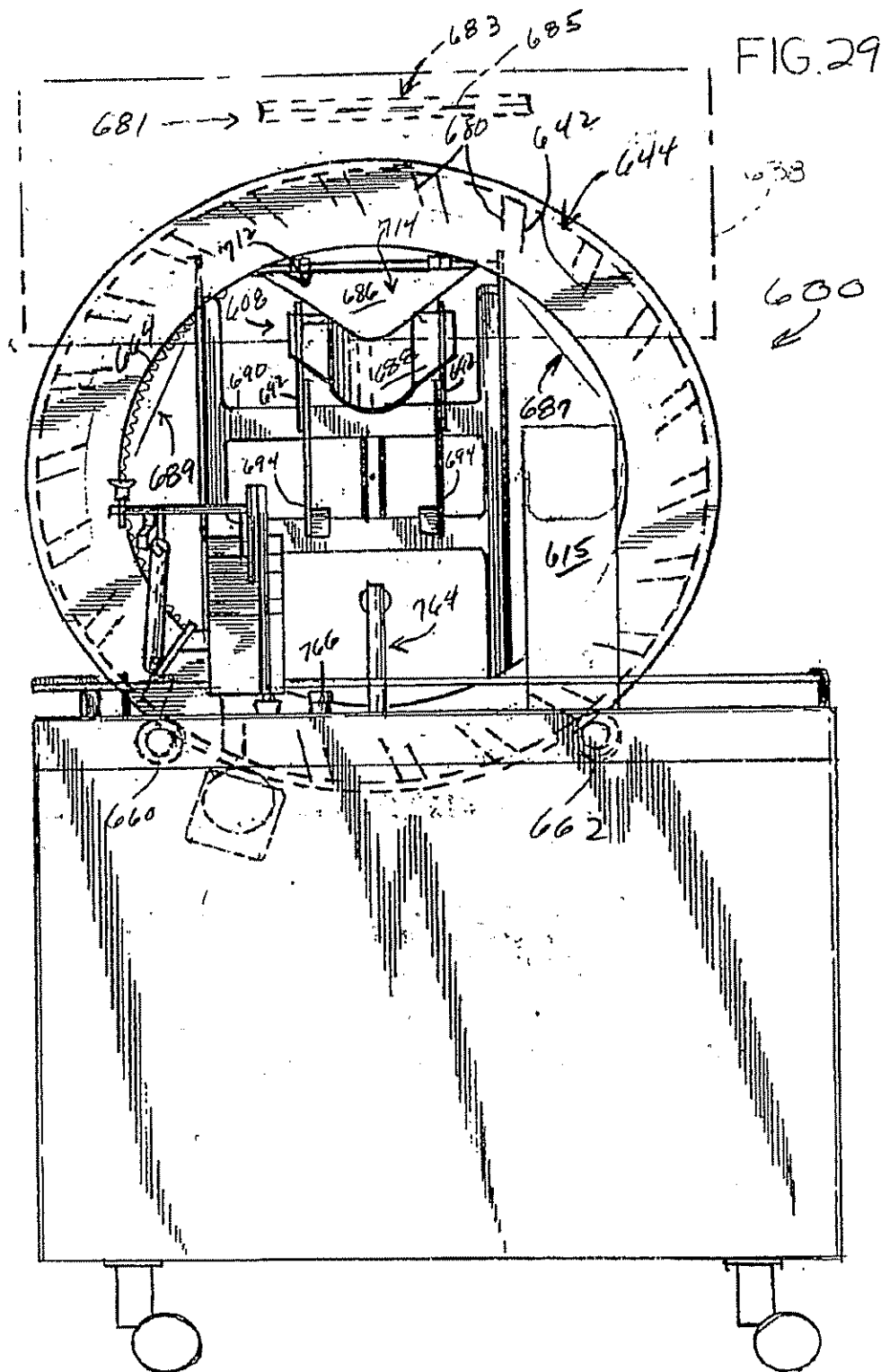












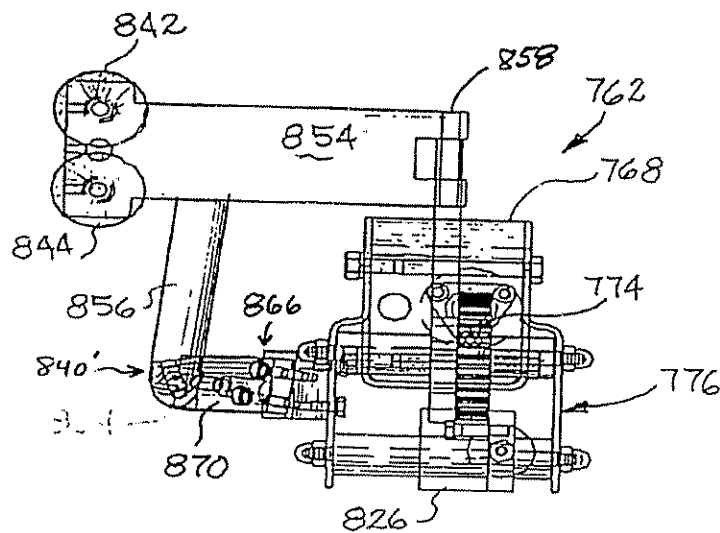
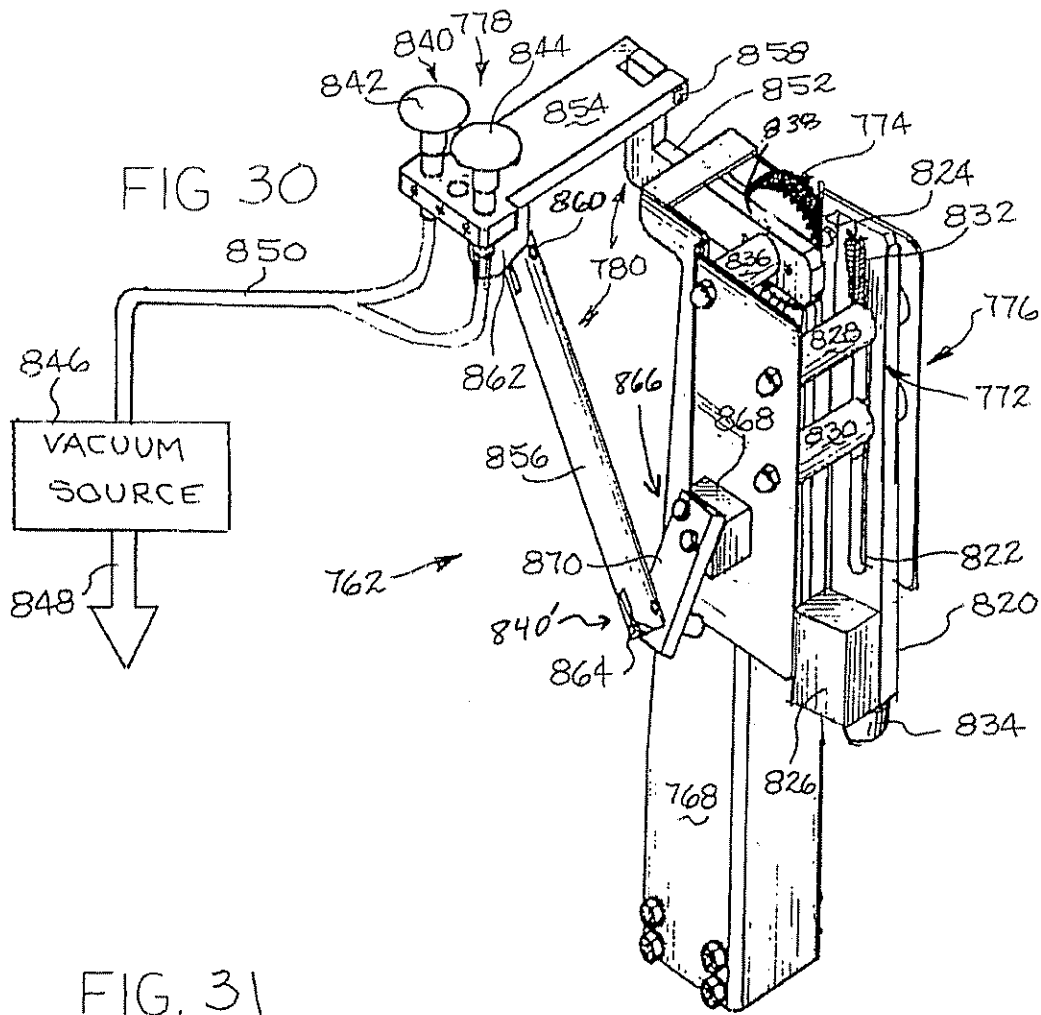


FIG 32

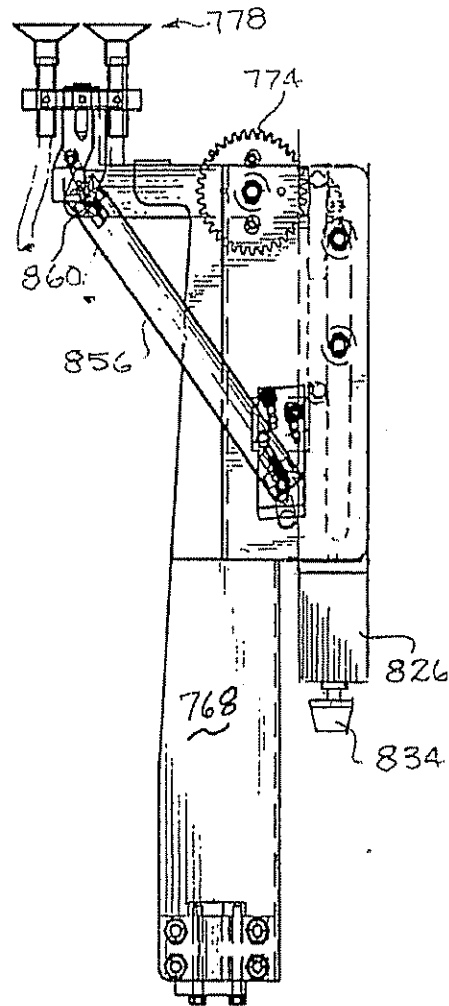
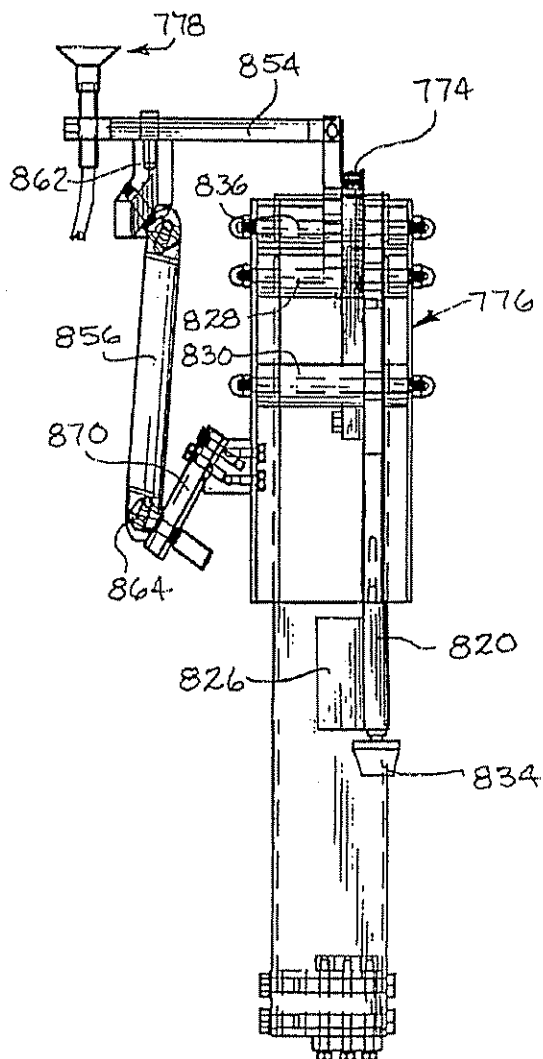
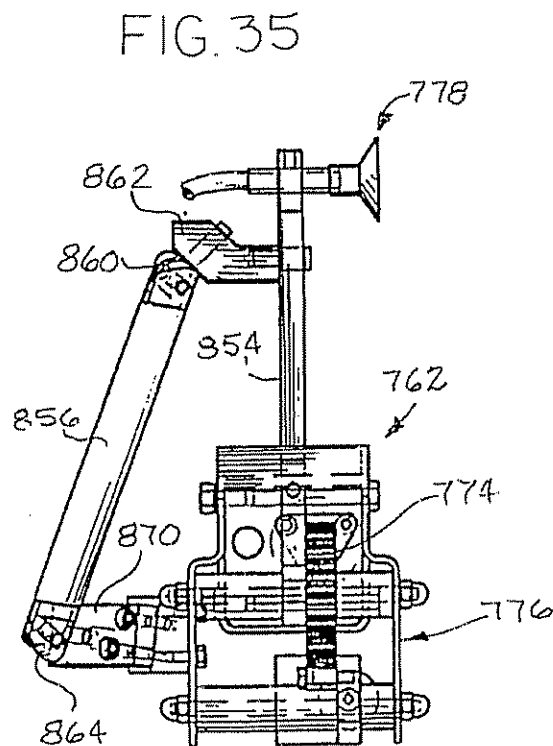
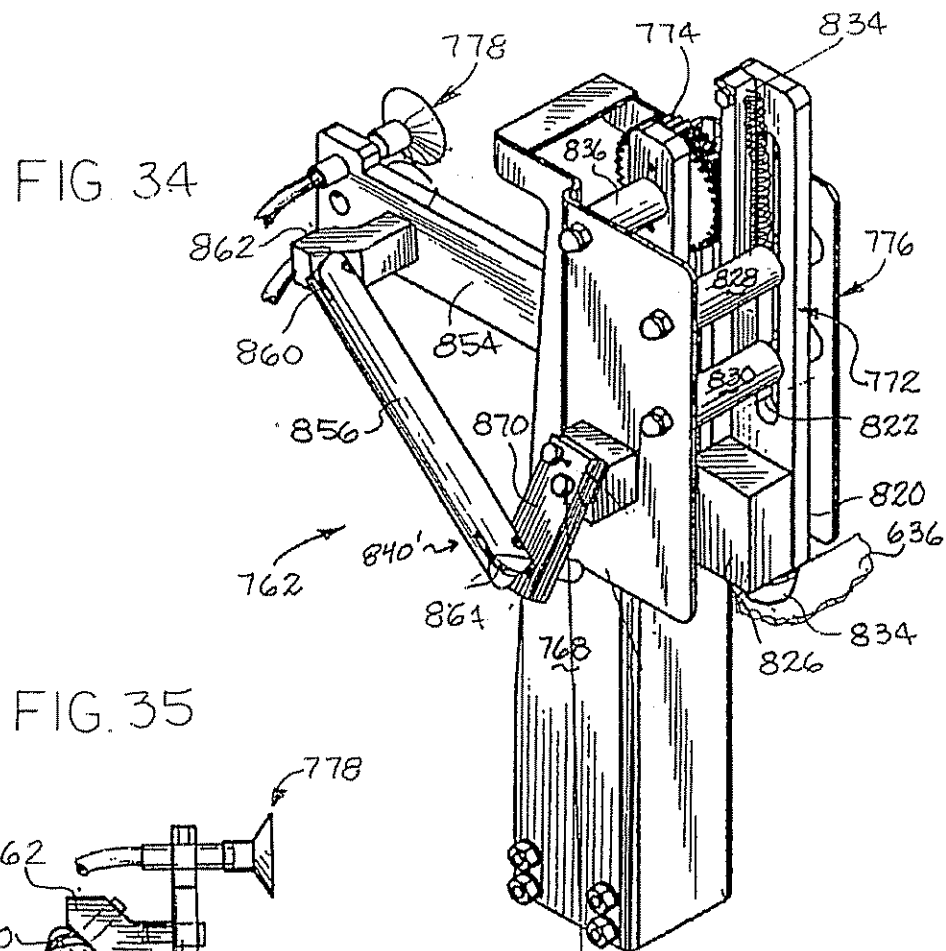
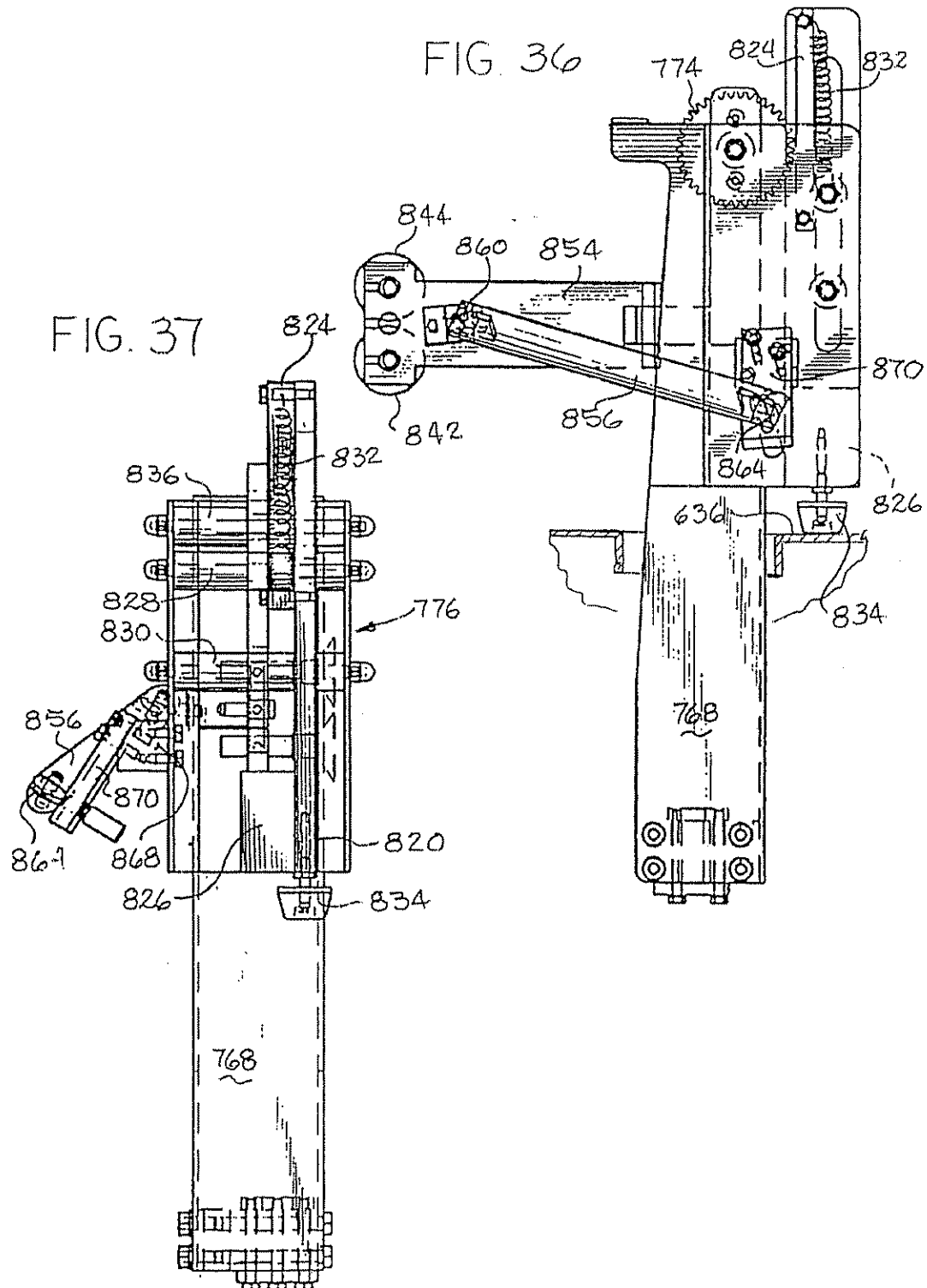
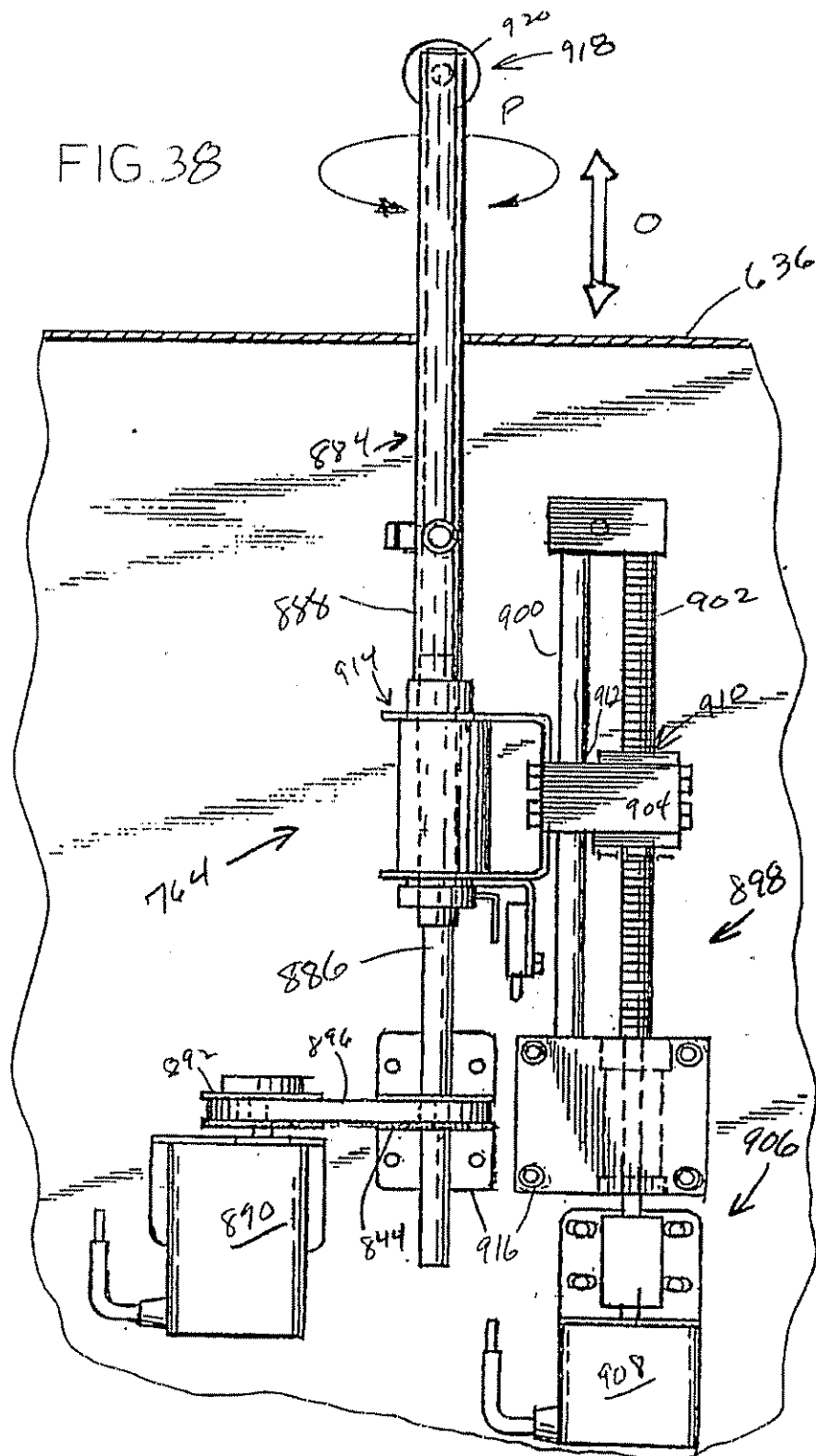


FIG 33









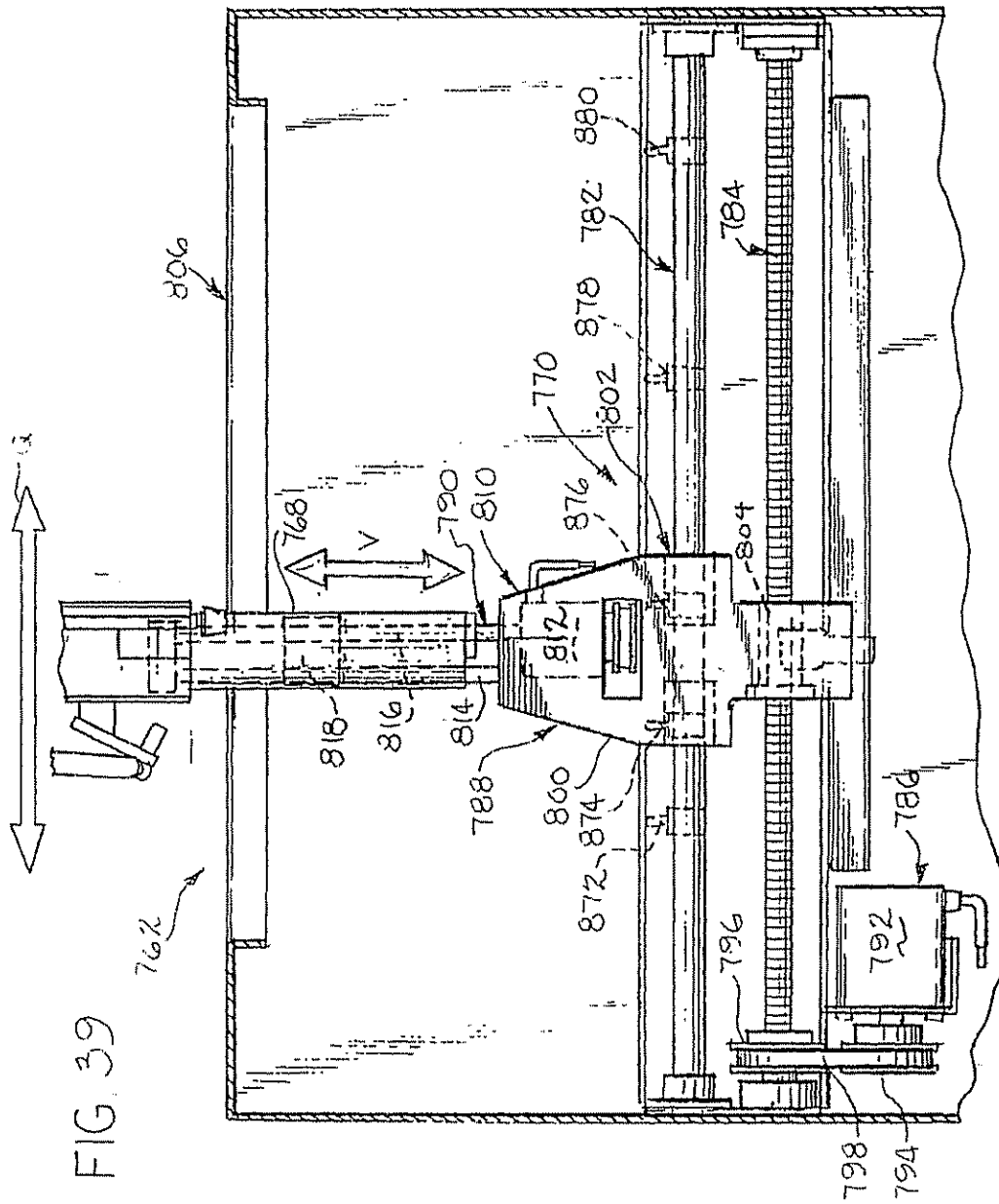


FIG 40

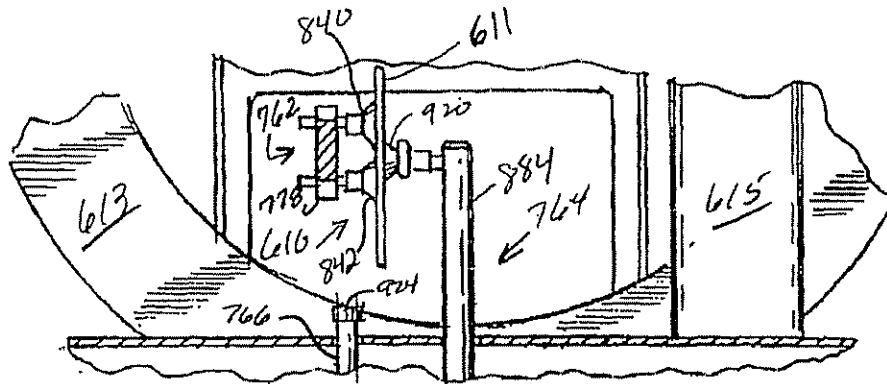


FIG 41

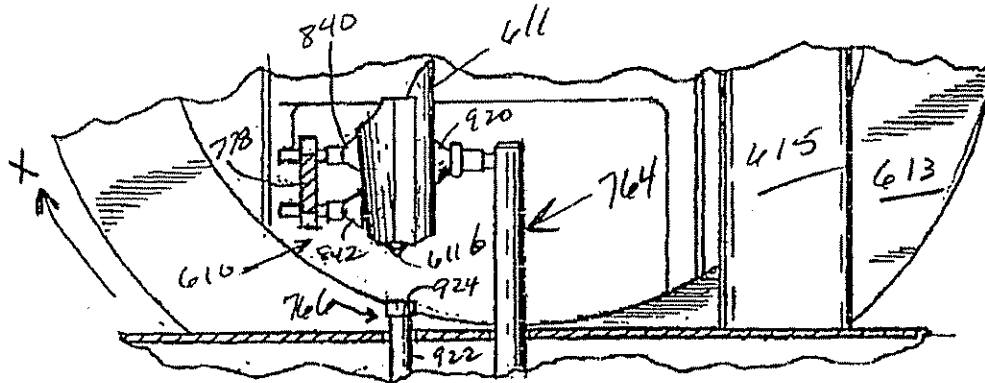


FIG 42

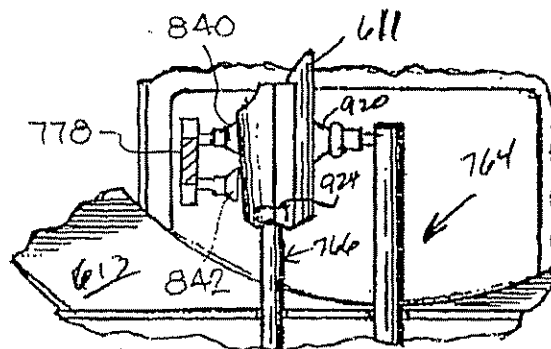


FIG 43

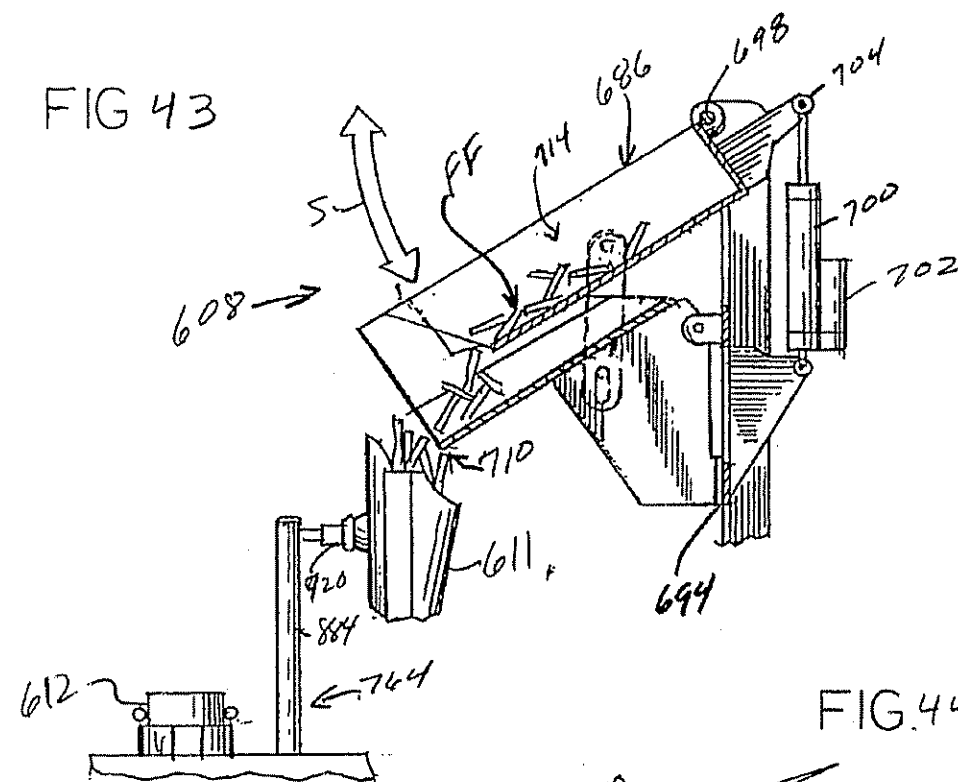


FIG.44

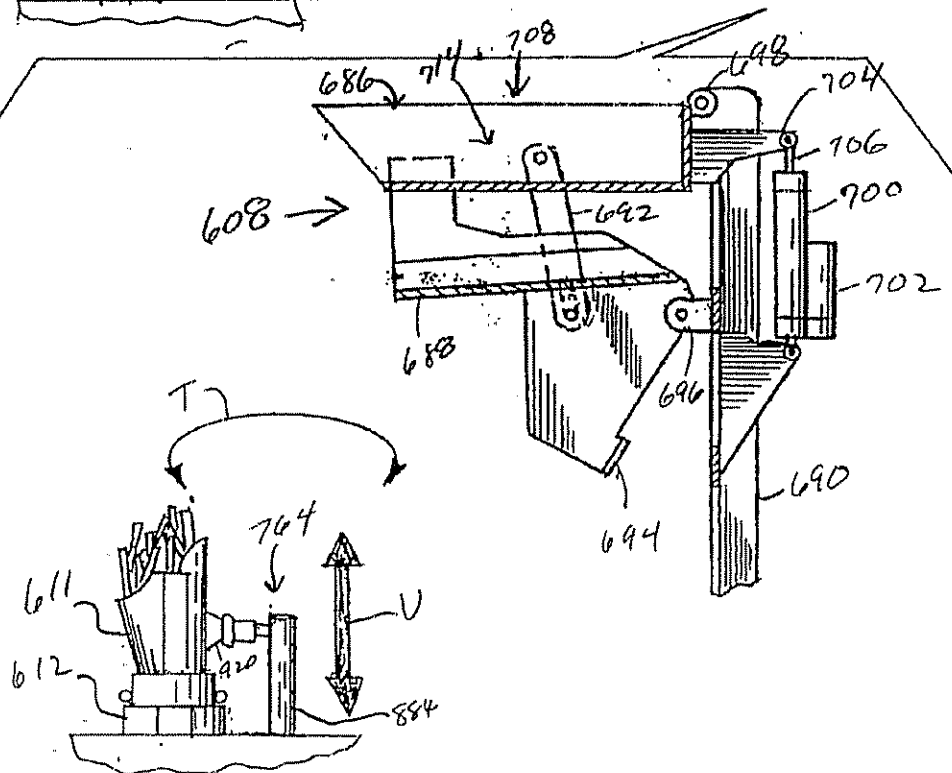
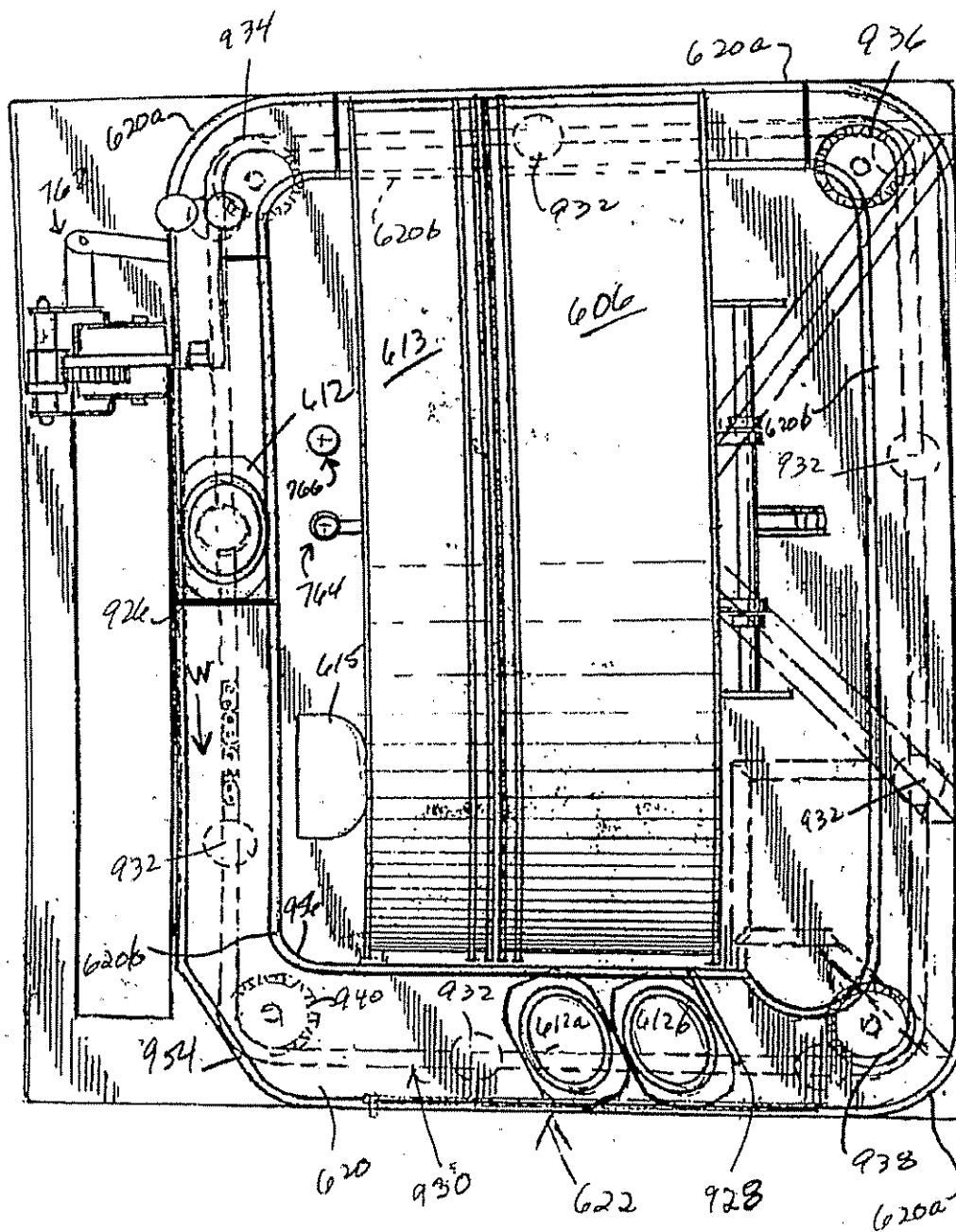


FIG. 45



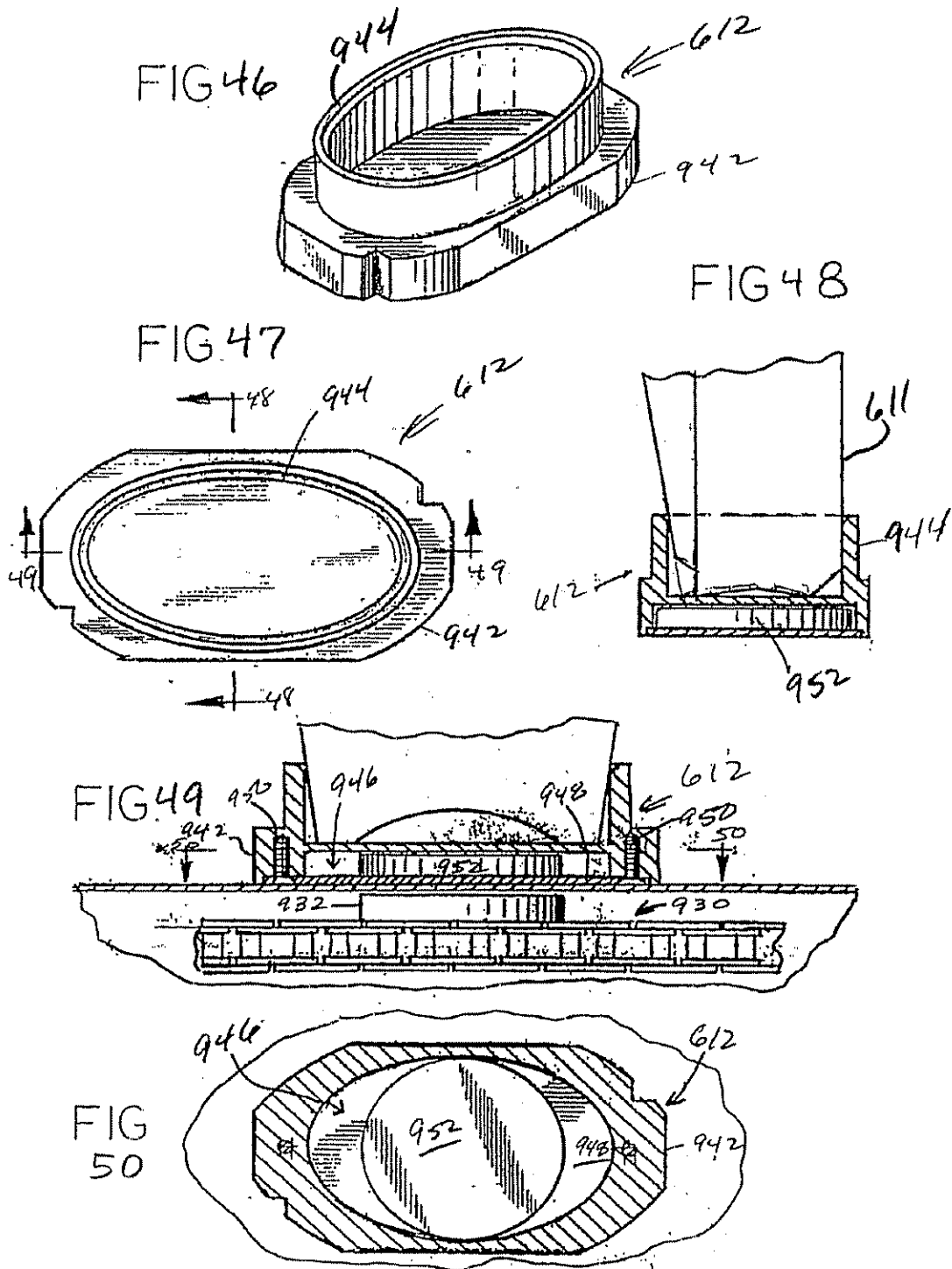


FIG. 51

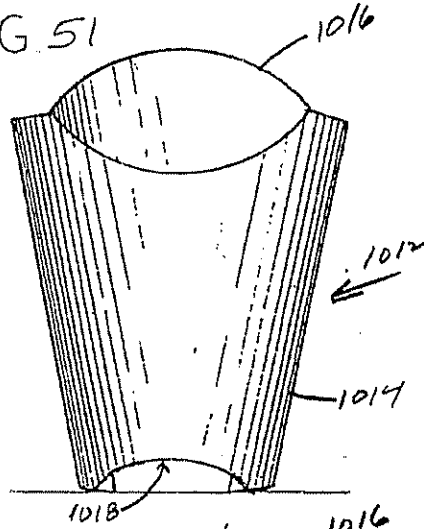


FIG. 52

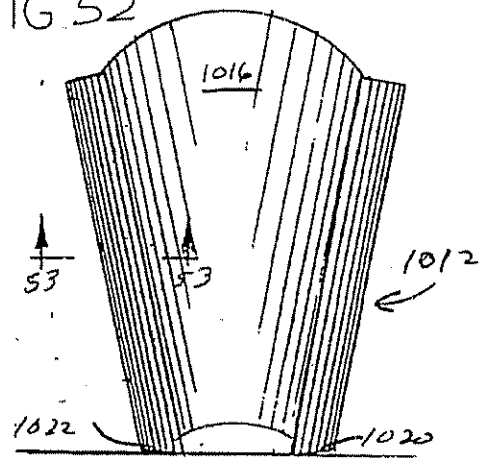


FIG. 53

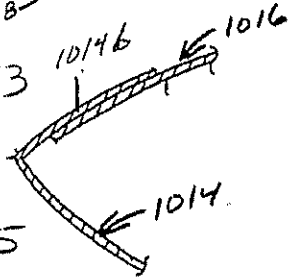


FIG. 55

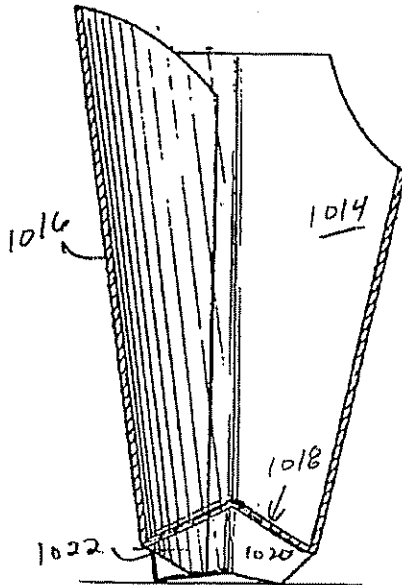


FIG. 54

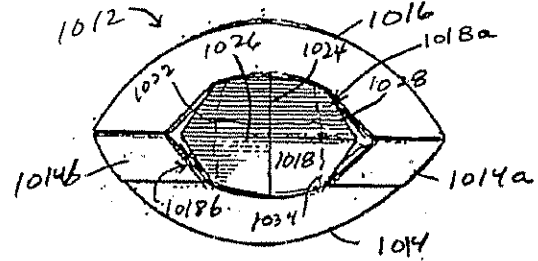


FIG. 56

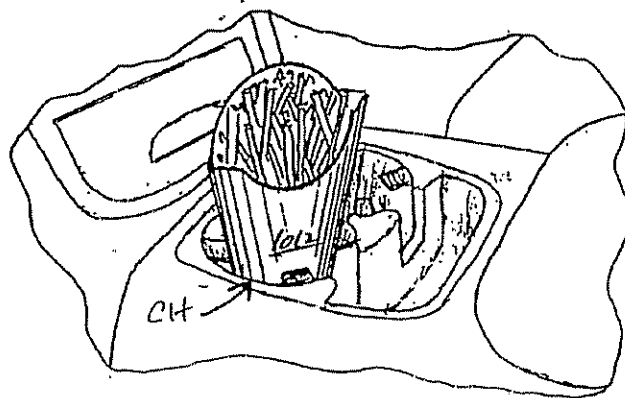


FIG. 57

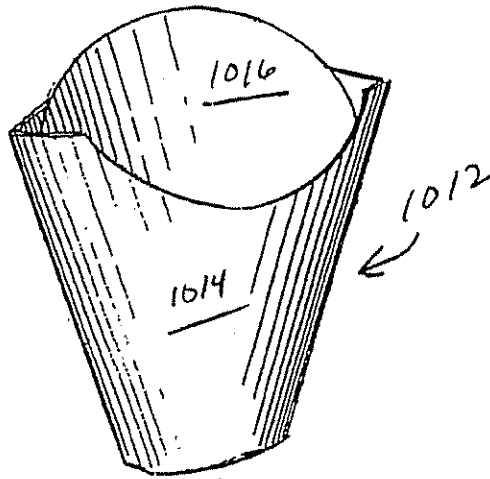


FIG. 58

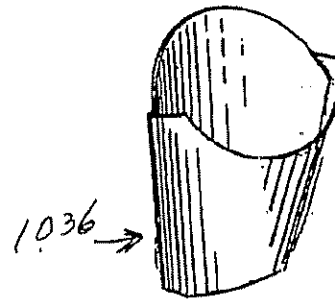


FIG. 59

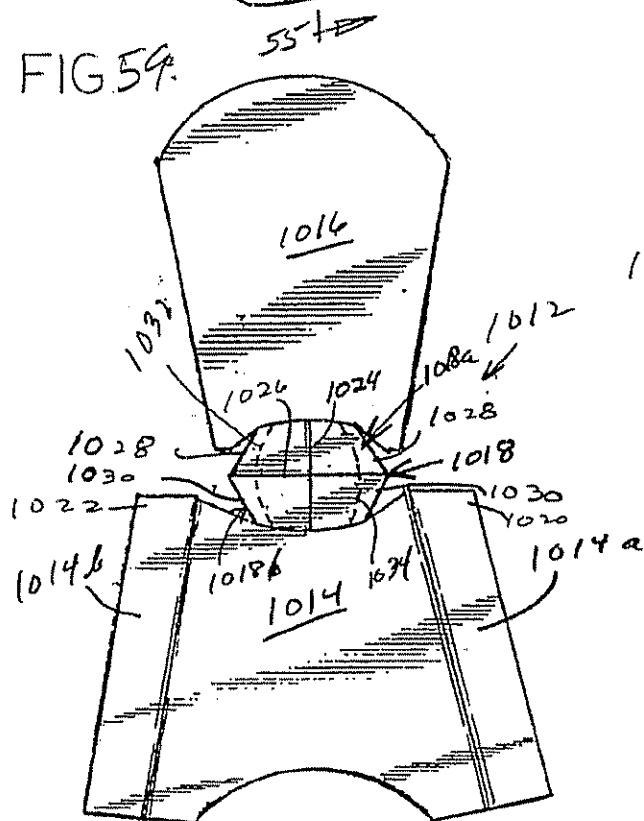
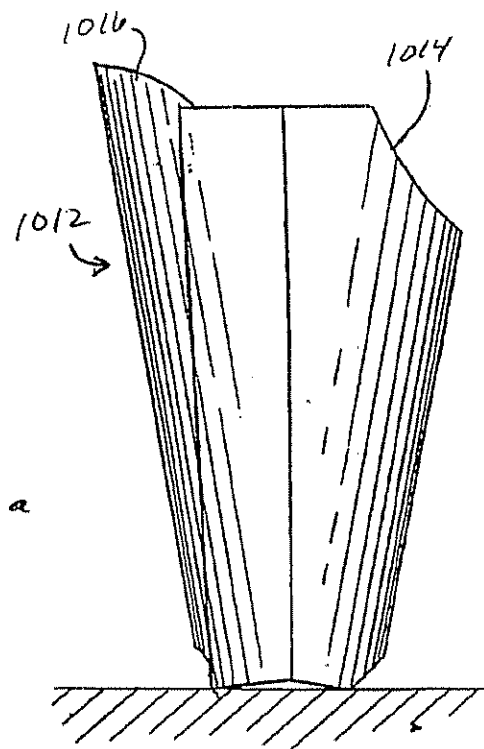
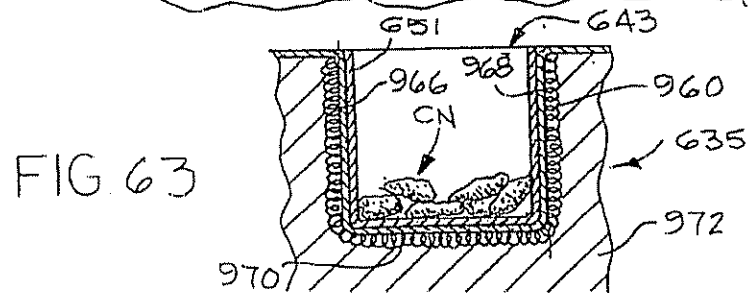
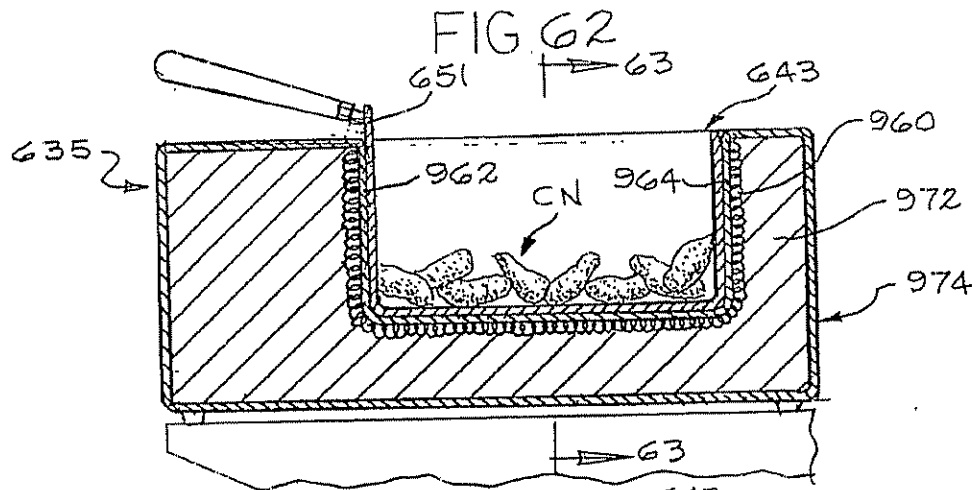
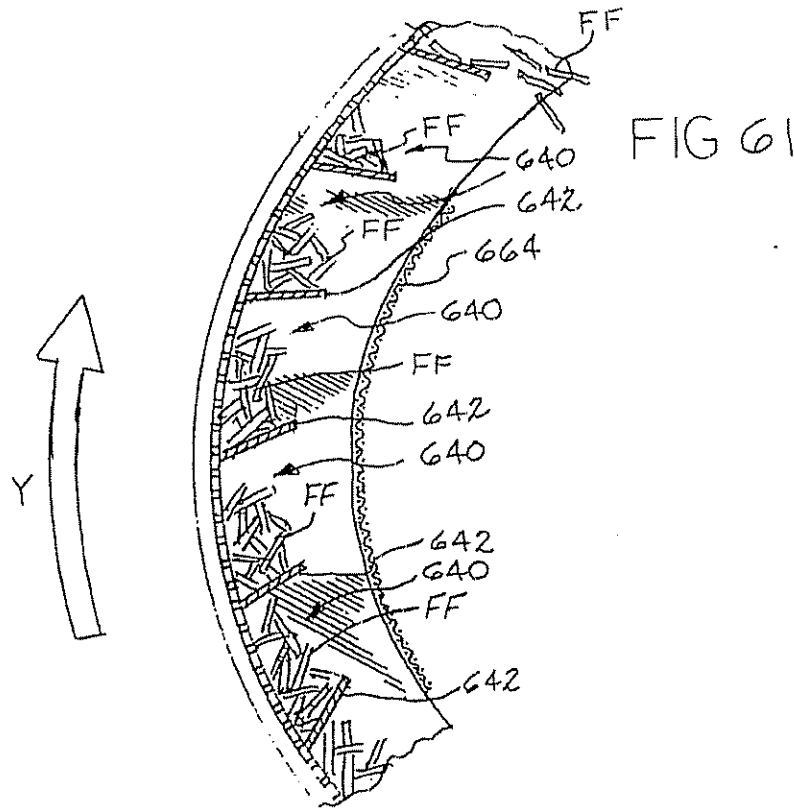
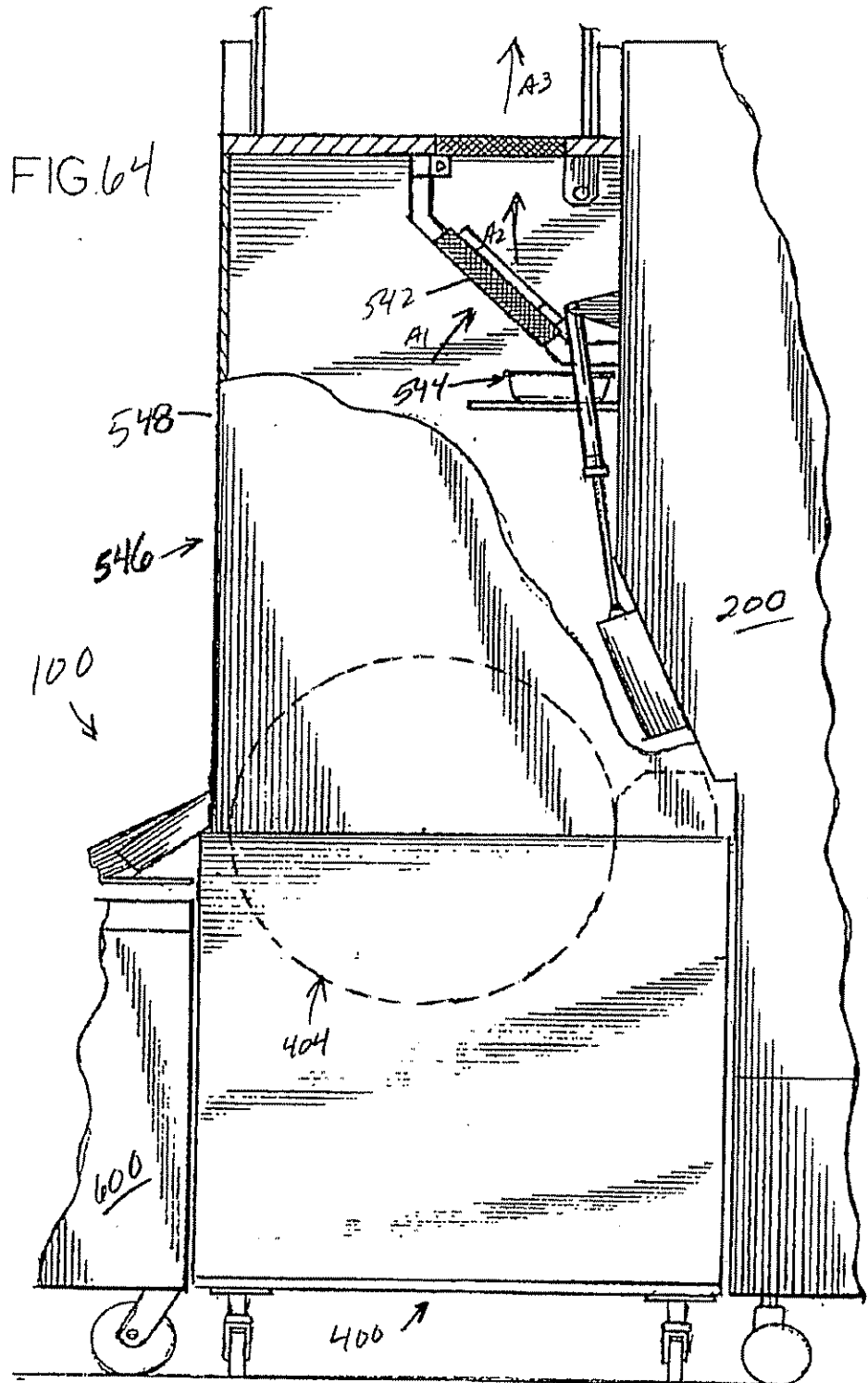
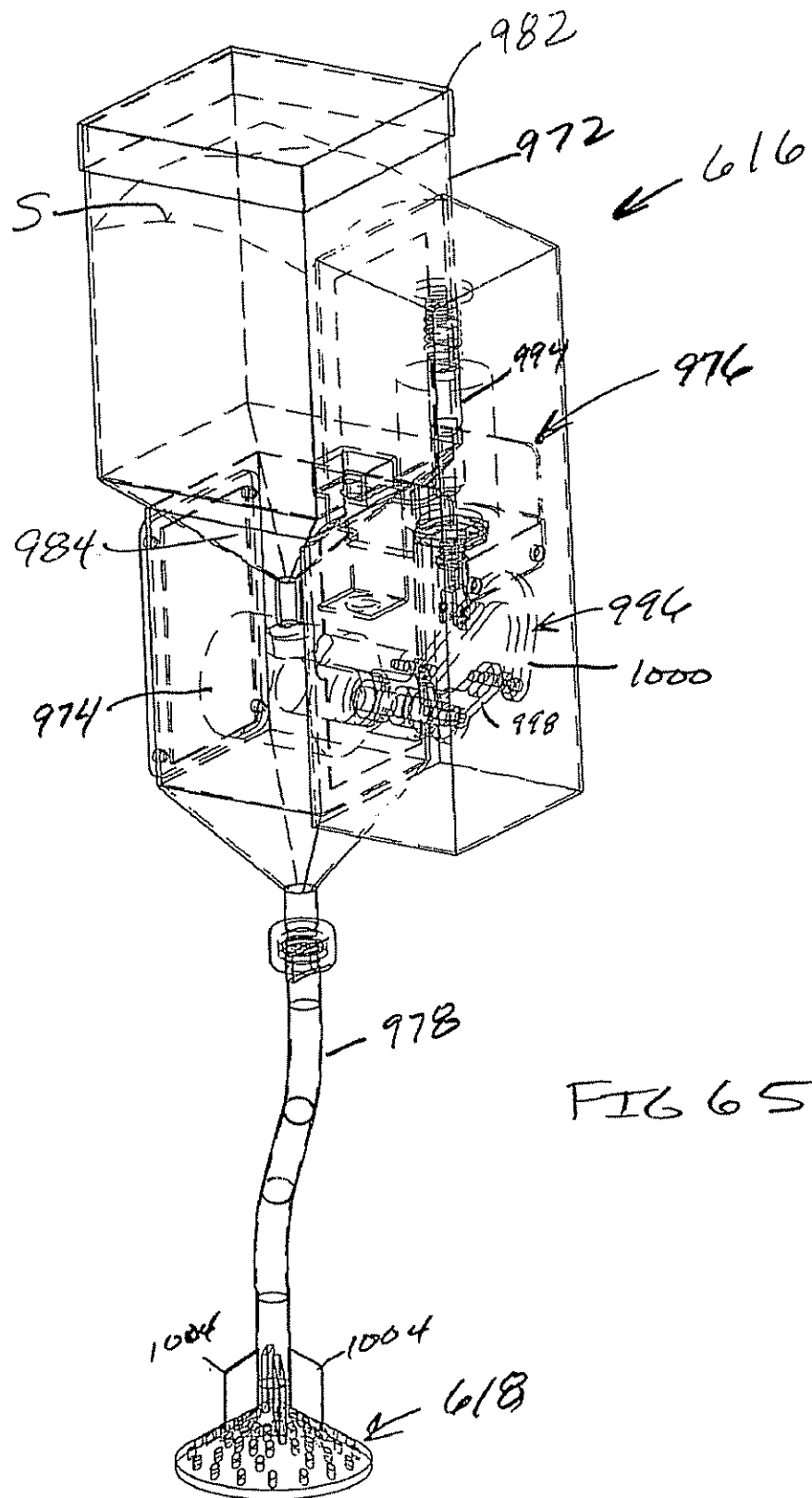


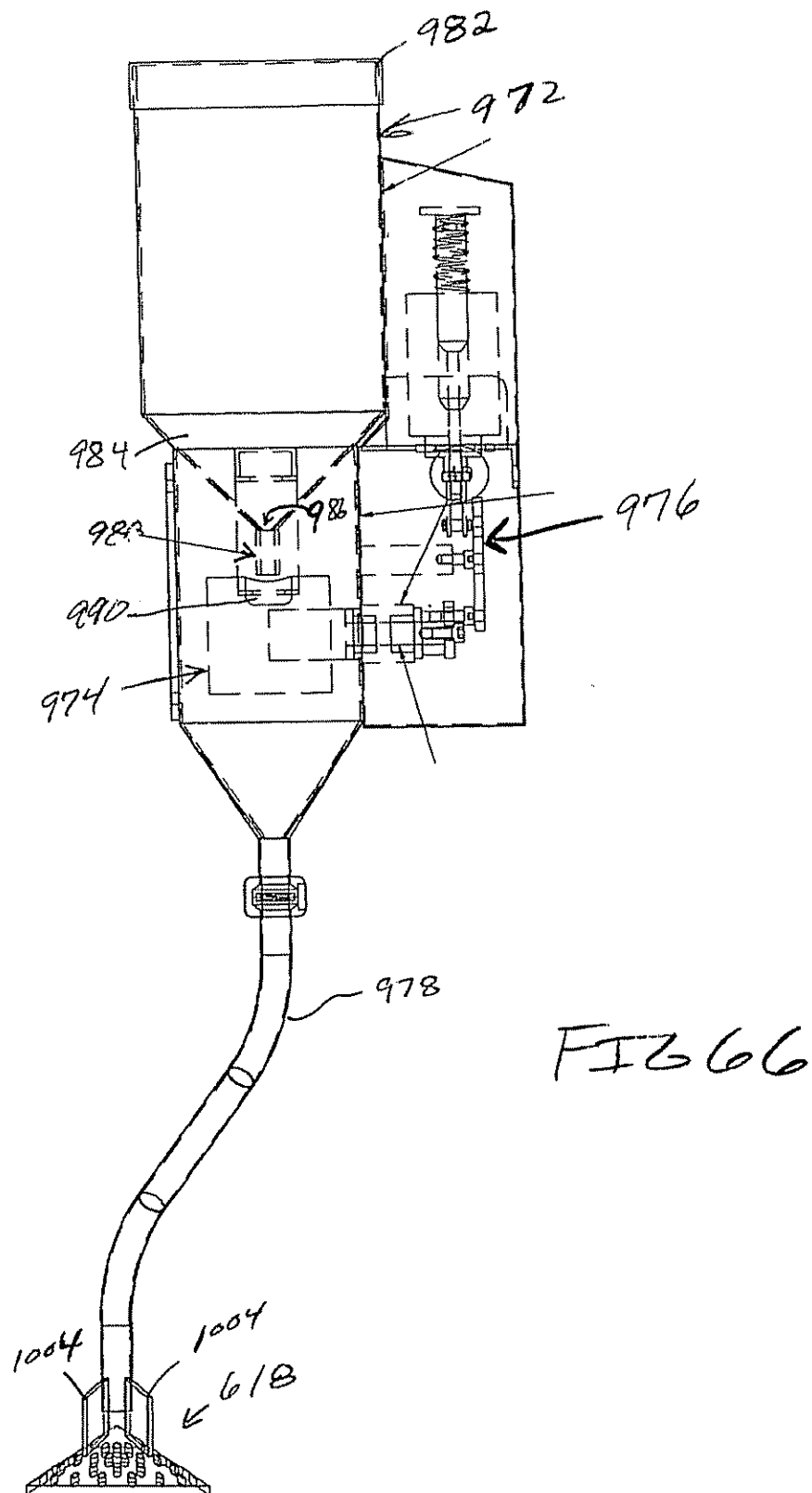
FIG. 60











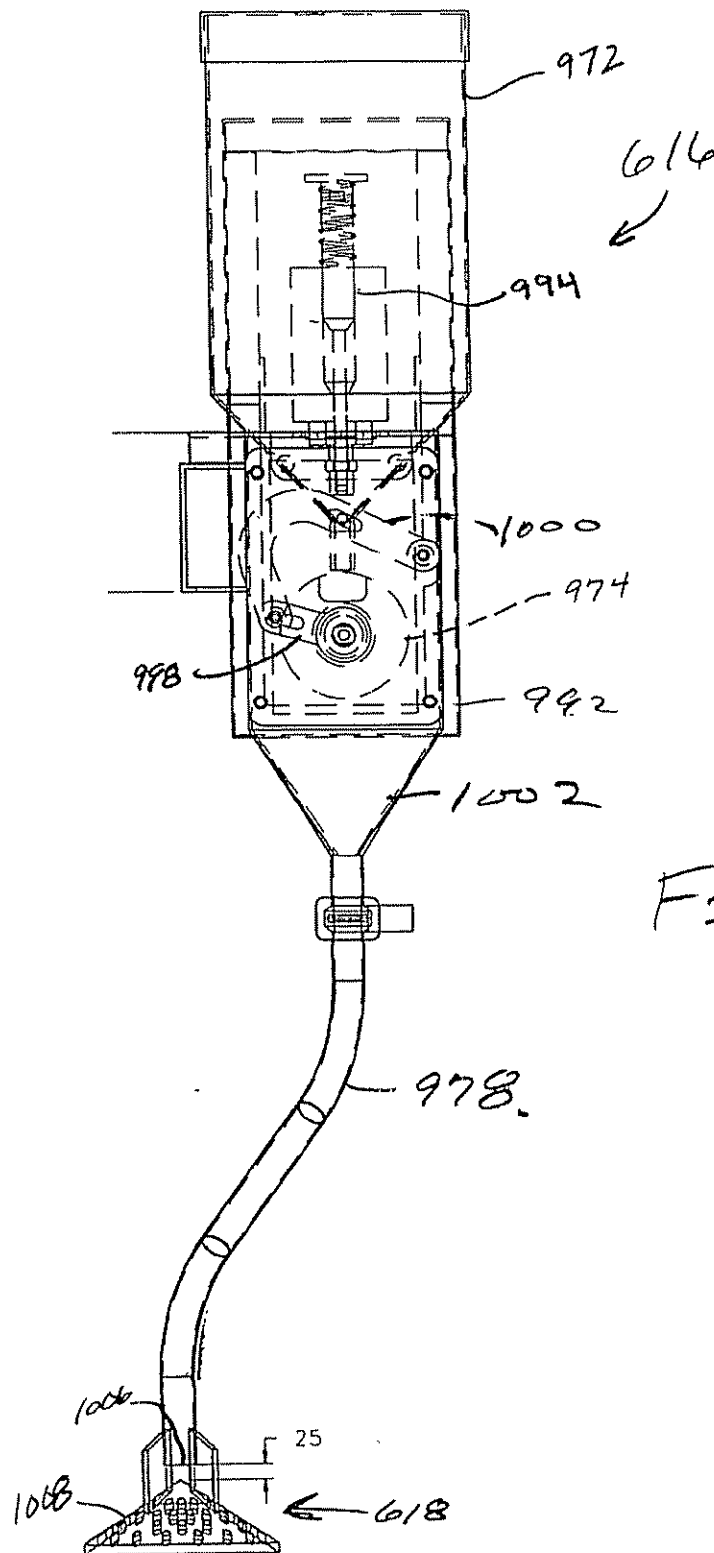


FIG. 67

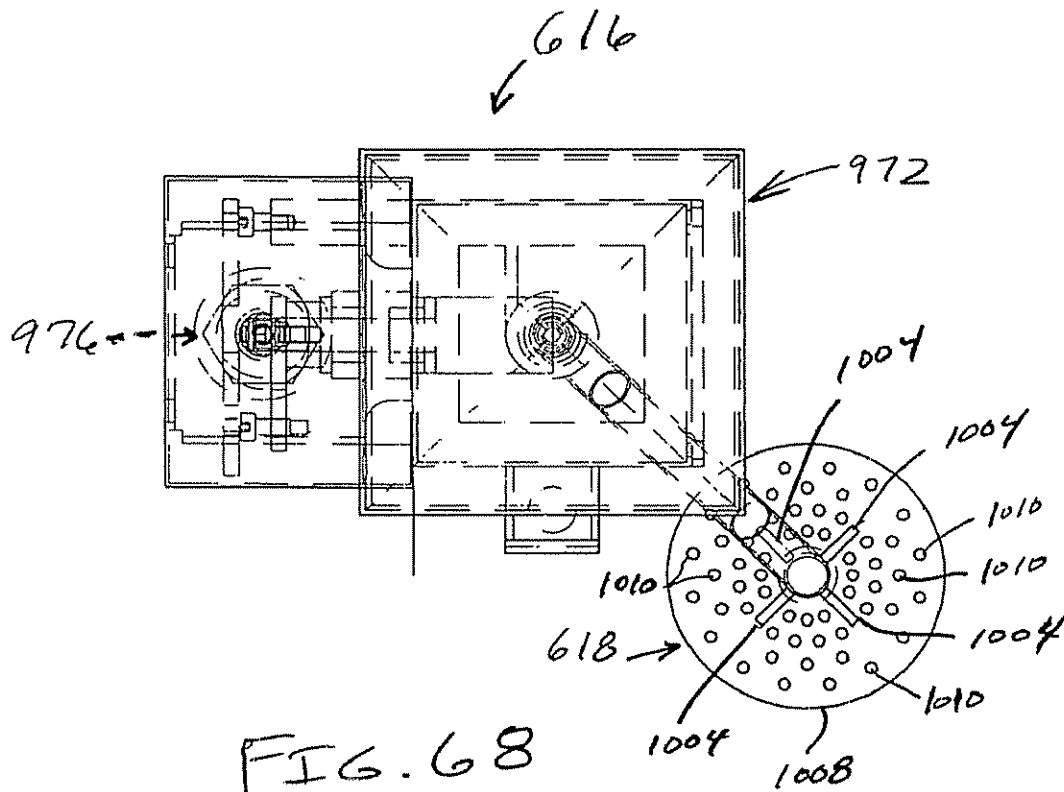


FIG. 69

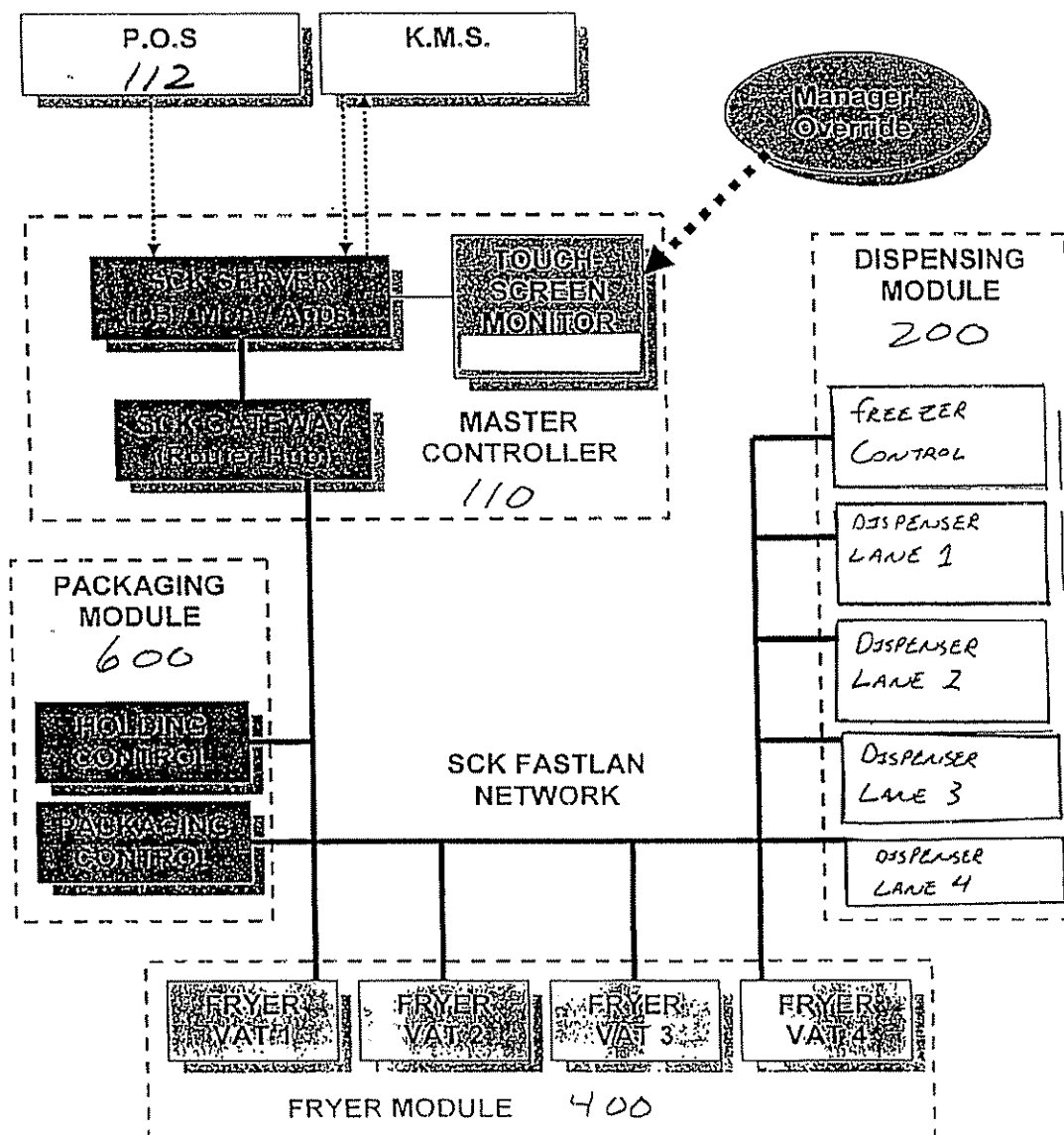


FIG. 70

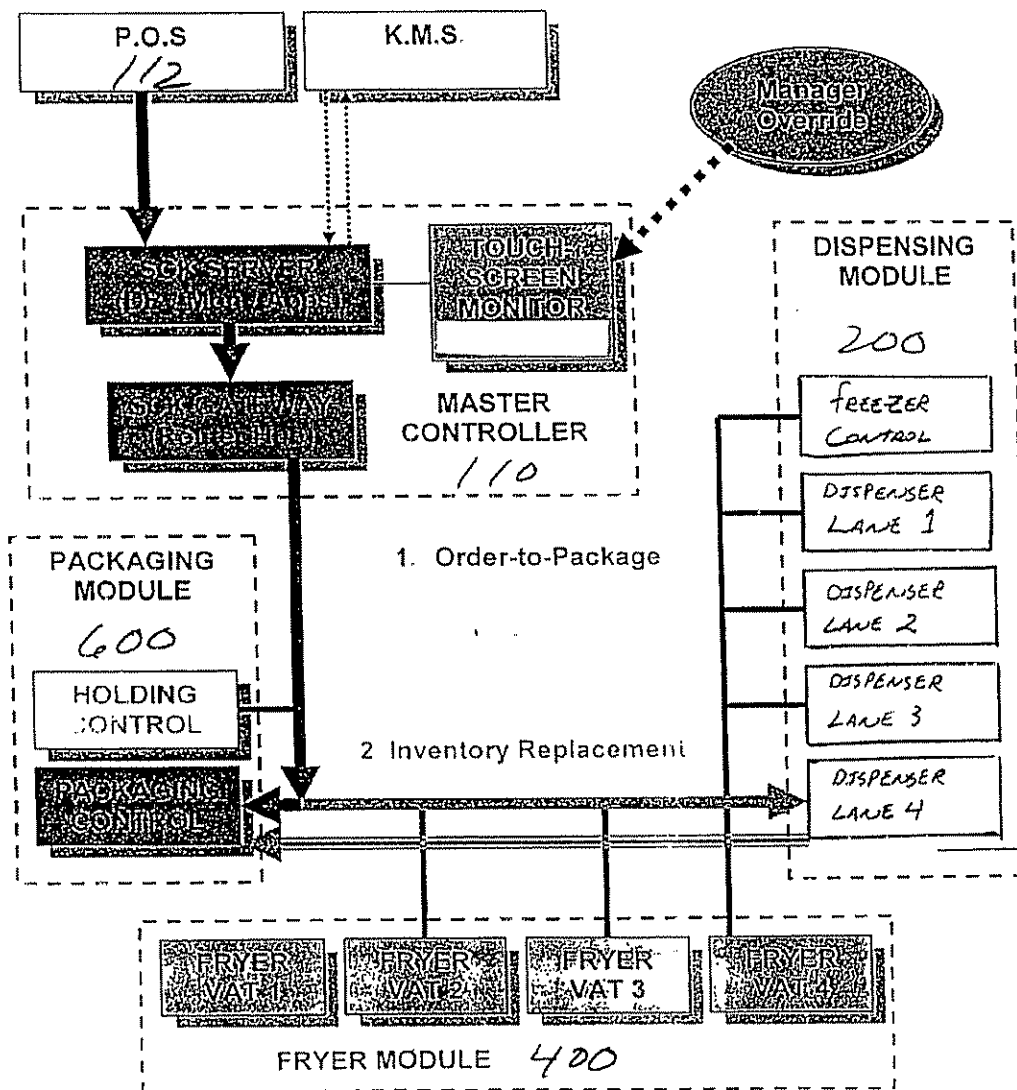


FIG. 71

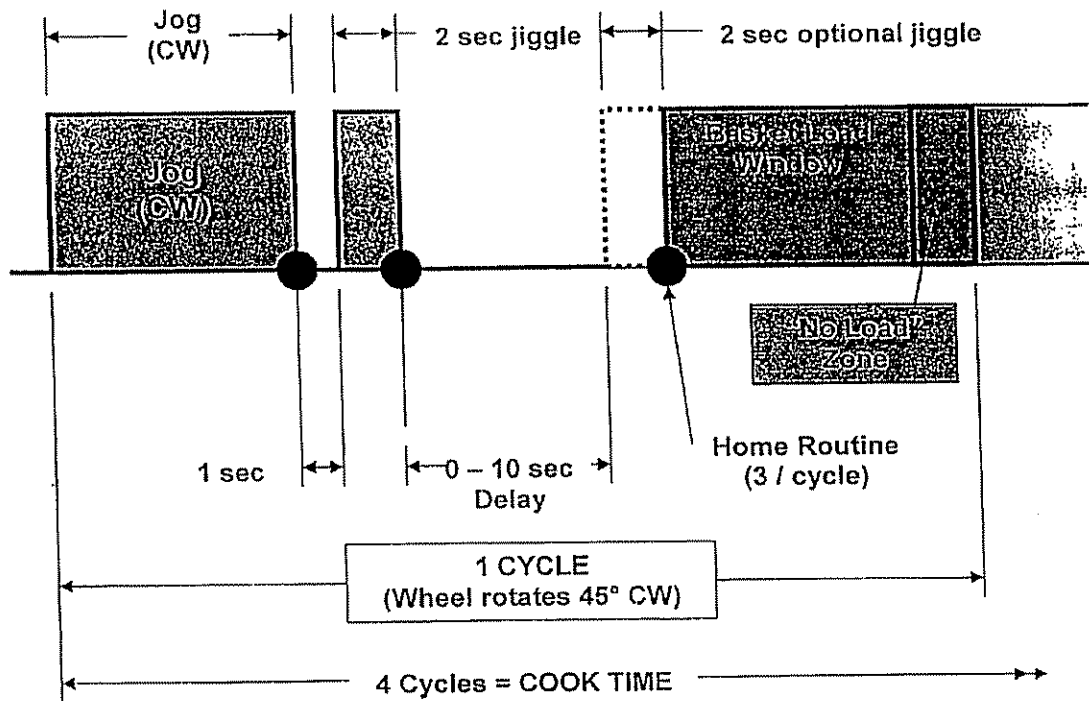


FIG. 72

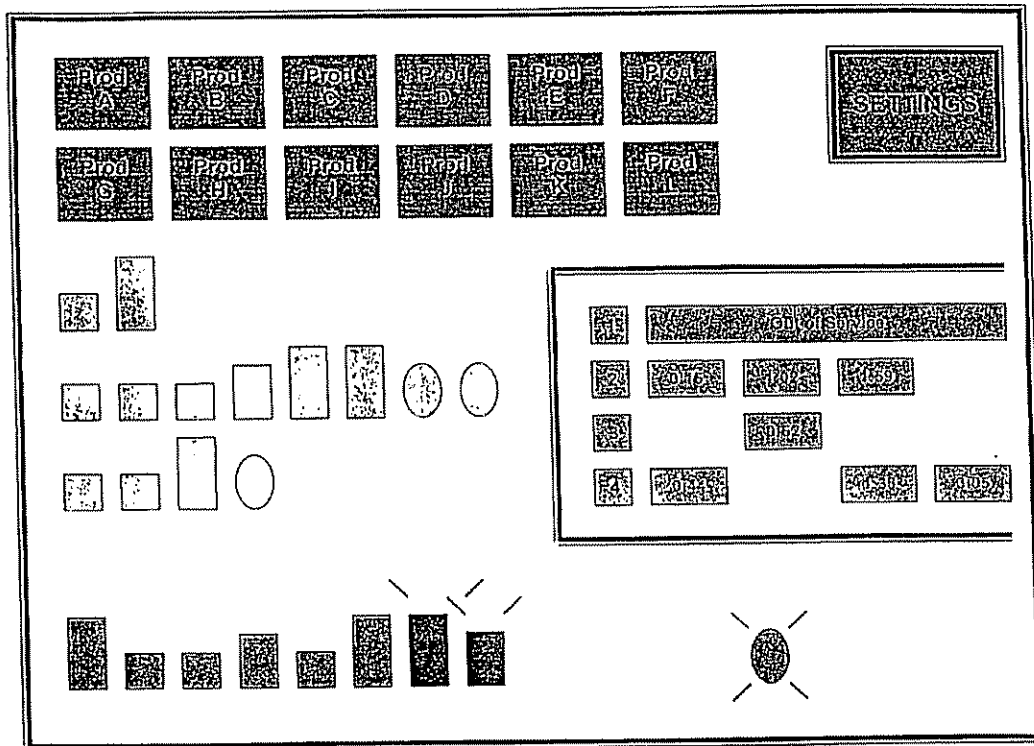





Fig. 73

Lane 1	Out of Service			
Lane 2	French Fries	Vat Temp	Set 375 F	Act 374 F
Lane 3	French Fries	Cook Time	Set 3:10	
Lane 4	Hash Browns	Cook Time	Set 3:23	
Pkg Temp Set 155F Act 153F		Freezer Temp Set -10F Act -10F		  

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AUTOMATED METHOD FOR PACKAGING FOOD**FIELD OF THE INVENTION**

[0001] The invention relates to automated food processing. More particularly, the invention relates to automated food dispensing, frying and packaging into individual portion-sized containers such as at a quick-service type restaurant.

BACKGROUND OF THE INVENTION

[0002] In restaurants, especially quick service (fast food) restaurants, fast, consistent, efficient and safe food preparation is essential for a successful operation. The quality of the prepared food depends in large part on the consistency of food preparation. The food must be cooked under correct conditions for the proper time.

[0003] Consistency in food preparation can vary as a result of many factors. For example, people engaged in food preparation often must perform multiple tasks at frequencies that vary with time because of constantly varying customer demand throughout the day. For example, lunchtime and dinnertime may be extremely busy while other periods may be relatively slow. The product mix can vary from hour to hour and day to day. As a result, the consistency and quality of food may vary. Difficulties in proper scheduling of food production during peak and non-peak periods can cause customer delays and/or wait, wasted or unusable food.

[0004] Food preparation can be labor intensive, and thus, the labor cost can be a large portion of the total cost of the prepared food. An additional problem is that in sparsely populated and other areas where quick service restaurants are located, such as along interstate highways, for example, recruiting sufficient numbers of suitable employees is difficult.

[0005] Quick service restaurants must be able to effectively meet a variable customer demand that is time dependent and not subject to precise prediction. As a result, stores relying totally on human operators will at times be over-staffed and at other times be under-staffed. Also, problems and potential problems can exist in restaurants where people directly prepare food. Health and safety concerns can also be present where food is prepared directly by people. By reducing or minimizing human contact with food and food cooking equipment, health and safety concerns can also be reduced or minimized. For example, in the frying of foods, some type of hot fluid, such as cooking oil or shortening must be utilized. The cooking temperatures required can present a concern for health and safety.

[0006] Although quick service restaurants have existed for many years and now number in the tens of thousands, such establishments utilize manual labor to prepare and process food. While there have been various improvements in commercial equipment used for cooking food in quick service restaurants, such restaurants are believed to be substantially all manually operated and relatively labor intensive.

[0007] Accordingly, a need exists for an automated, commercially suitable food dispensing, cooking and packaging device, system and method for fried foods that can be operated with a minimum of human intervention, control and maintenance. More particularly, a need exists for an automated device, system and method that is capable of,

without human labor, frying various food products in desired quantities, such as French fries, seasoning the cooked food and packaging the cooked food in individual portion-sized containers.

SUMMARY OF THE INVENTION

[0008] In accordance with the present invention, an automated food processing system and method is provided. The automated food processing system and method in accordance with the invention allows food to be dispensed, fried and packaged in a suitable container or alternatively dispensed to a food holding area for subsequent processing by a human operator.

[0009] In accordance with one aspect of the present invention, an automated module system for dispensing, frying and packaging food into individual portion-sized containers is provided. In one embodiment, any suitable automated dispensing device can be used. In another embodiment, the system includes an automated dispensing module capable of dispensing a desired quantity of food to be fried, an automated fry module adjacent the dispensing module to receive and fry the quantity of food dispensed from the dispensing module and to produce and dispense a quantity of fried food and an automated packaging module adjacent the fry module to receive and package the fried food from the fry module into an individual portion-sized container.

[0010] Advantageously, in one embodiment, the three modules are independent from each other and can be operated independently. Plus, in one embodiment, any one of the modules can be deactivated and a human operator can manually perform the function of the deactivated module with manually operated equipment.

[0011] In accordance with another aspect of the invention, optionally an automated seasoning device is present to apply seasoning to the food.

[0012] Typically, the automated dispensing module in accordance with the invention in one embodiment is capable of dispensing one or more of uncooked or unheated French fries, chicken nuggets, hash browns, chicken patties and fish filets or similar types of food items to be cooked and/or heated.

[0013] In accordance with another aspect of the invention, the automated dispensing module includes a freezer, a storage container located in the freezer for containing food to be dispensed, structure for dispensing a predetermined quantity of food from the storage container into a secondary or dump container, with the structure for dispensing and the secondary or dump container being located in the freezer, and structure for dispensing the quantity of food from the secondary or dump container to a location outside of the freezer.

[0014] In accordance with another aspect of the present invention, the fry module of the automated modular system includes a fry vat for containing and heating cooking oil, at least one circular fry wheel having at least a generally circular perimeter in a plurality of compartments, each compartment having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel, which radial axis is disposed above the normal operating level of the frying oil or the cooking oil in the fry vat. A drive mechanism is provided for

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rotating the fry wheel. In one aspect of the invention, any suitable type of automated fry device can be utilized.

[0015] In accordance with another aspect of the present invention, a control system is provided for causing the drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of angular rotation (such as about 2-10°, for example) to simulate shaking of a fry basket. Such control can be accomplished electronically by devices known to those skilled in the art.

[0016] In another embodiment, food is delivered from the fry module to a cooked food holding device, which can comprise a heated holding bin or bins.

[0017] In accordance with still another aspect of the present invention, the automated packaging module includes a rotatable food dispensing member having an inlet location to receive a quantity of cooked food at a discharge location to discharge cooked food, the packaging module also including a food dispensing chute position to receive cooked food from the discharge location of the rotatable food dispenser, the food dispensing chute having a discharge location.

[0018] In accordance with another embodiment of the invention, the automated modular system further includes a carton holding device for holding the individual portion-sized carton or container in position to receive food from the discharge location of the dispensing chute. The packaging module may further include a rotatable food collecting member disposed to collect food from the discharge location of a dispensing chute that is not deposited into the individual portion-sized food container. The so collected food may be subsequently deposited into the food dispensing chute for delivery to a container or alternatively to the rotatable food dispensing member or to a waste receptacle or chute.

[0019] In accordance with another aspect of the invention, the automated packaging device includes a conveyor system for transporting filled individual portion-sized food containers from adjacent the filling location to a filled food container holding area, for subsequent pick-up by a human operator, for example. In one embodiment, any suitable automated packaging device can be utilized.

[0020] In accordance with another aspect of the present invention, an automated food carton-retrieving device is provided for retrieving and grasping individual portion-sized food containers. The automated retrieving device comprises a moveable member for selectively grasping and releasing the food container. In one embodiment, the retrieving device is capable of grasping and releasing an unerected food container on one side and the device further includes a second device for selectively grasping the unerected food container on the other side with structure for moving the retrieving device and the second device relatively apart when grasping the sides of the container to erect or partially erect the container.

[0021] In another embodiment, an automated urging structure is provided for urging the container bottom upwardly relative to the sides of the container when the sides of the container are moved relatively apart.

[0022] In accordance with another aspect of the invention, the automated modular system includes an electronic control system that receives current customer order information and the electronic control system causes the selection of a

container from a plurality of different container sizes and further causes filling of food with the size of food container in response to a customer order. In one aspect, the electronic control system can receive customer order information and controls the dispensing rate of food dispensed from the food dispensing module to the fry module which dispensing automatically determines the amount of food being fried without further intervention by the electronic control. In one aspect, the control system can include a separate control system for each of the dispensing, fry and packaging systems or modules, each of which interface with a central control system, which in turn optionally interfaces with a POS (point-of-sale) system.

[0023] In accordance with another aspect of the invention, the automated modular system is suitable for dispensing, frying and packaging French fries into individual portion-sized containers.

[0024] In accordance with another aspect of the present invention, an automated method of dispensing, frying and packaging food into individual portion-sized containers is provided that includes dispensing a desired quantity portion of food to be fried from an automated dispensing module to an automated fry module and thereafter frying the portion of food dispensed from the dispensing module in the automated fry module adjacent the dispensing module to produce a quantity of fried food. Thereafter, the quantity of fried food is dispensed from the fry module to a packaging module where the fried food dispensed from the fry module is packaged into individual portion-sized containers with an automated packaging module.

[0025] In another aspect of the invention, the automated method further comprises seasoning the quantity of fried food with a seasoning device.

[0026] In accordance with another aspect of the invention, the dispensing includes dispensing a predetermined quantity of food from the storage container into a secondary container located in a freezer and dispensing the quantity of food from the secondary container to a location outside of the freezer.

[0027] In accordance with another aspect of the method of the present invention, the frying comprises a rotating fry wheel having at least a generally circular perimeter and a plurality of compartments, each compartment having an opening towards the perimeter, the food being contained in at least one of the compartments during the frying, the fry wheel being mounted for rotational movement relative to the radial axis of the fry wheel in a fry vat with the radial axis being disposed above a normal operating level of the cooking oil in the fry vat. In accordance with this aspect of the invention, the automated method further includes containing a drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of angular rotation to simulate shaking of a fry basket during frying.

[0028] In accordance with another aspect of the invention, the packaging includes rotating a rotatable food dispensing member having an inlet location to receive a quantity of cooked food in a discharge location to discharge cooked food, the food dispensing member being rotated to dispense food into a food dispensing chute position to receive cooked food from the discharge location of the rotatable food dispenser and thereafter dispensing said food from the dispensing chute to a container to be filled.

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[0029] In accordance with another aspect of the invention, the method further includes holding an individual portion-sized carton or container positioned to receive food from the dispensing chute with an automated carton holding device.

[0030] In accordance with still another aspect of the invention, the method further includes collecting food dispensed from the discharge location of the dispensing chute that is not deposited into the individual portion-sized food container with a rotatable food collecting member disposed to collect such not deposited food

[0031] In accordance with another aspect of the method, the method includes electronically coordinating the operation of the three modules or devices within an electronic control system. In one embodiment, the method further includes electronically receiving current customer order information by the electronic control system which causes selection of a container from a plurality of different sized containers and filling the container with food of the ordered size of food container in response to a customer order by the packaging module. In accordance with another aspect of the method, customer order information is electronically received and the dispensing rate of food dispensed from the food dispensing module to the fry module is controlled, which dispensing automatically determines the amount food being fried without further intervention by the electronic control system.

[0032] In accordance with another aspect of the present invention, an automated dispensing device for dispensing a quantity of food to be subsequently cooked is provided. In one embodiment, the automated dispensing device includes a freezer or refrigerated compartment, a storage container located in the freezer for containing food to be dispensed, structure for dispensing a predetermined quantity of food from the storage container into a secondary or dump container, the structure for dispensing the predetermined quantity of food being located in the freezer, and structure is provided for dispensing the quantity of food from the secondary or dump container in the freezer to a location outside of the freezer.

[0033] In one embodiment, the structure for dispensing a predetermined quantity of food includes a vibratory conveyor typically located in the freezer below the storage container. The structure for dispensing may further include a device for determining or sensing the quantity of food that has been deposited in the secondary container and structure is provided for terminating the operation of the structure for dispensing when a predetermined quantity of food is sensed in the secondary container.

[0034] In accordance with another aspect of the present invention, the automated dispensing device includes structure for dispensing a predetermined quantity of food that comprises a food magazine capable of dispensing individual pieces of food on a piece by piece basis. In accordance with a more specific aspect of this embodiment, the magazine comprises dual rotatable spiral flights with the spiral flights having a spacing therebetween to allow placement of a food item, such as a chicken patty, for example, to be supported by both spiral flights

[0035] In accordance with another aspect of the invention, the magazine dispenser is suspended from a slide mechanism permitting removal of the magazine from the freezer or

refrigerated compartment. A plurality of the magazines can be located on a single slide mechanism. An array of the magazines may be located in the freezer, such as a 3x5 array or a 3x4 array, for example.

[0036] In one embodiment, a separate drive motor is associated with each food dispensing magazine for selectively rotating spiral flights of a magazine dispenser for dispensing a desired number of the food items. The drive motor may also be located in the freezer

[0037] In accordance with another aspect of the invention, an automated method of dispensing a quantity of food to be cooked is provided. The method includes storing food items in a storage container located in the freezer, dispensing food items from the storage container to a conveyor, conveying the food items on the conveyor to a secondary or dump container located in the freezer, monitoring the amount of food items delivered to the secondary container, terminating delivery of the food items to the secondary container when a desired amount of food items are determined to be present in the secondary container as determined by the monitoring, and dispensing the food items from the secondary container and out of the freezer by at least partially inverting the secondary container. In accordance with another aspect of this embodiment, a freezer or refrigerated compartment is not utilized

[0038] In accordance with another aspect of the present invention, a device for the automated frying of foods is provided. The device in one embodiment includes a fry vat for containing and heating cooking oil, at least one circular fry wheel having at least a generally circular perimeter and a plurality of compartments with each compartment having an opening towards the perimeter, the fry wheel mounted for rotational movement relative to the radial axis of the fry wheel which radial axis is disposed above the normal operating level of the frying oil in the fry vat. A drive mechanism is provided for rotating the fry wheel and a control system is included for causing the drive mechanism to periodically rotate the fry wheel back and forth through a relatively small amount of rotation (such as about 2-10°, for example) to simulate shaking of a fry basket. Such control can be accomplished electronically by devices known to those skilled in the art

[0039] In accordance with another aspect of the present invention, the small amount of rotation is in the range of from about 2° to about 20°. The back and forth rotation in one direction may be of a larger angle or amount of rotation than of the rotation in the other direction

[0040] In one embodiment, a control system is provided that causes periodic incremental rotation of the fry wheel in one direction to cause food deposited into one of the compartments to travel through the cooking oil in the fry vat over a period of time to fry the food and to move the compartments out of the cooking oil for subsequent discharge of the food from the compartment. In one embodiment, the periodic incremental rotation is based on 360° divided by the number of compartments in the fry wheel.

[0041] In accordance with another aspect of the present invention, a control system is provided for operating the drive mechanism to rotate the fry wheel in one direction to cause food deposited into one of the compartments to travel through the cooking oil in the fry vat over a period of time

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to fry the food and out of the cooking oil for subsequent discharge of the food from the compartment, wherein the control system adjusts the speed of rotation based on the level of cooking oil in the fry vat. In one embodiment, the control system causes incremental periodic rotation of the fry wheel and the control system adjusts the period of time between incremental rotations based on the level of cooking oil sensed in the fry vat. The period of time between incremental rotations can also be based on the temperature of the cooking oil in the fry vat.

[0042] In accordance with another aspect of the invention, a curved baffle is provided that is disposed in the fry vat adjacent the axial periphery of the portion of the fry wheel that is disposed in the cooking oil for preventing food contained in one or more of the fry wheel compartments from falling out of the compartments.

[0043] In accordance with another aspect of the present invention, an automated method of frying food in a fry vat having a heated cooking oil contained therein is provided. The method includes placing food in a fry wheel compartment, each of the compartments having an opening towards the perimeter of the fry wheel, rotating the fry wheel so that the compartment containing the food travels submerged in the heated cooking oil and periodically rotating the fry wheel back and forth in a relatively small amount of rotation to simulate shaking of the fry basket while the food is submerged in the cooking oil. In accordance with another aspect of the method of the present invention, the method comprises rotating the fry wheel in one direction to cause the food deposited into one of the compartments to travel through the cooking oil in the fry vat over a period of time to fry the food and to move the food out of the cooking oil for subsequent discharge of the food from the compartment, wherein the speed of said rotating is related to the level of cooking oil in the fry vat. In accordance with this aspect of the present invention, the rotating may comprise incremental periodic rotation with the period of time between incremental periodic rotations being based on the level of cooking oil sensed in the fry vat. The period of time between incremental periodic rotations may also be based on the temperature of the cooking oil in the fry vat.

[0044] In accordance with another aspect of the present invention, an automated method of packaging cooked food, which may be food such as French fries, chicken nuggets and other types of food, in an individual portion-sized container is provided. The method includes delivering a quantity of a cooked food to a rotatable dispensing member, rotating the dispensing member to cause the food items to fall from one or more compartments of the dispensing member into a food dispensing chute and thereafter dispensing the food from the chute and depositing the food into the individual portion-sized food container.

[0045] In accordance with one aspect, the method may further include weighing the food in the chute before dispensing the food to the container.

[0046] In accordance with another aspect of the invention, the method includes applying seasoning to the food and may further include applying the seasoning by using gravity to cause the seasoning to travel through a nozzle and onto the food.

[0047] In accordance with another aspect of the invention, the method further includes shaking the individual portion-

sized food container after the dispensing. The shaking may be automated and can include back and forth movement of the container through an arc as desired, and may be in a generally vertical axis. The arc may be a generally circular arc and the rotating back and forth may encompass an arc in the range of from about 3° to about 20°. In addition, the container may be raised and lowered before, during or after the rotating to further simulate shaking or in connection with further container handling.

[0048] In accordance with another aspect of the invention, when dispensing food from the chute to the individual portion-sized container, some of the dispensed food is not deposited into the individual portion-sized container and the method further includes collecting the not deposited food. Typically, the not deposited food will be collected in a collection device that returns the not deposited food to the chute for subsequent dispensing. In one embodiment, the collection member is rotatable and can be rotated to deposit the collected food to the chute. This helps to ensure that the not deposited food is subsequently deposited into a container on a first-in, first-out or a generally first-in, first-out basis.

[0049] In accordance with another aspect of the present invention, an automated method of packaging food, including food such as French fries, in an individual portion-sized container is provided that includes delivering a quantity of food to a food dispensing chute, selecting and holding with an automated device an individual portion-sized container of a desired size from a plurality of different sizes of individual portion-sized containers that can be selected and held by the automated device. The selected individual portion-sized container is moved by the automated device to a location for receiving food from the dispensing chute and food is dispensed from the chute and into the container. The method may further include depositing the filled food container onto a conveyor by operation of the automated device and transporting the deposited container by the conveyor to a human operator food pickup location.

[0050] In accordance with another aspect of the foregoing method, the individual portion-sized food container is unerected and the method further includes after the selecting, erecting the selected individual portion-sized food container by the automated device. In one embodiment, the automated device includes a partial vacuum suction device for holding the individual portion-sized food container and the holding includes applying a partial vacuum through a suction device to the food container. The food container can be released by reducing or eliminating the vacuum applied by the suction device to the food container sufficiently to cause the food container to be disengaged from the automated device.

[0051] In accordance with another embodiment of the method, the filled food container is placed in an upright position on a transportable member or container-receiving receptacle which in one embodiment contains a single food container and is maintained in an upright position on the transportable member by cooperation of the recessed volume of the transportable member and the food container.

[0052] In accordance with another aspect of the invention, the transporting is performed by a magnetic conveyor.

[0053] In accordance with still another aspect of the invention, an automated device for packaging cooked food

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into a desired container, which may be an individual portion-sized food container is provided. The device includes a rotatable food dispensing member having an inlet location to receive a quantity of the cooked food and a discharge location to discharge the cooked food. A food dispensing chute is positioned to receive the cooked food from the discharge location of the rotatable food dispenser and the dispensing chute has a discharge location. In one embodiment, the dispensing chute has a food holding area for holding a quantity of the cooked food deposited therein. A suitable weighing device can be associated with the dispensing chute to weigh the food that is contained in the chute or in the holding area of the chute. In one embodiment, the weighing device is a load cell.

[0054] In accordance with another aspect of the invention, the automated device includes a food carton or container holding device for holding the food carton in position to receive food from the discharge location of the dispensing chute. The carton holding device can include an axially rotatable generally vertically extending elongated first member and a second member that extends from the elongated member, the second member having a gripping member for gripping a food container, which may be an individual portion-sized food container. In one embodiment, the gripping member comprises a suction cup. A vacuum source may be supplied to the suction cup to create at least a partial vacuum, allowing the container to be held. In one embodiment, the carton holding device is capable of moving the food container through an arc of about or of at least about 180° and in which the carton holding device is capable of moving the food container up and down.

[0055] In accordance with another aspect of the present invention, the automated device comprises a conveyor system for transporting filled individual portion-sized food containers from adjacent the filling location to a filled container holding area. The conveyor system may comprise in one embodiment a continuous loop raceway and a plurality of discrete moveable food container receptacles that are moveable along the raceway. The conveyor system may include a continuous moveable loop having at least one magnetic element capable of magnetically attracting one of the moveable receptacles at a time for causing movement of the receptacle corresponding to movement of the magnetic element. A plurality of the magnetic elements may be spaced apart along the moveable loop.

[0056] In one embodiment, structure is provided for preventing movement of the discrete receptacles when the structure for moving the discrete receptacles along the raceway is activated. The structure for preventing movement can be a barrier that is disposed across the raceway. In one embodiment, the barrier is selectively moveable and in another embodiment the barrier is fixed. In one embodiment, the barrier prevents movement of the receptacles only for a receptacle that has a food carton or container disposed thereon. In this embodiment, the barrier may be located at a height that is above the top of the receptacles located on the conveyor system adjacent the barrier.

[0057] In accordance with another aspect of the invention, an automated device is provided to retrieve and grasp a food container, which may be an individual portion-sized food or French fry container or carton. The automated retrieving device includes a member for selectively grasping and

releasing the food container and for moving the moveable member horizontally and linearly.

[0058] In accordance with another aspect of the invention, a magazine is provided for holding a plurality of food containers in an unerected state.

[0059] In accordance with another aspect of the invention, the automated device includes a retrieving device that is capable of grasping and releasing an unerected food container on one side and further includes a second device for selectively grasping the unerected food container on the other side. A structure for moving the retrieving device and the second device relatively apart when grasping the sides of the container is provided. The automated device may further include an automated urging means for urging the container bottom upwardly relative to the sides of the container when the retrieving device and the second device are moved relatively apart when grasping the container.

[0060] In accordance with another aspect of the invention, the food dispensing member is a rotatable wheel having an open central area and an outer at least generally circular rim. The rotatable wheel has a plurality of open compartments spaced apart about the circular rim that extend inwardly from the circular rim and open interiorly of the circular rim. A baffle may be provided to prevent food contained in the one or more of the open compartments from falling out of the compartments when the wheel is rotated until the compartment is in position over the food dispensing chute. The baffle may be curved to follow the curvature of the inner part of the wheel and may also be perforated. The automated device may further include a rotatable food collecting member that is disposed to collect food dispensed from the discharge location of the dispensing chute which food is not deposited into a container held in position at the discharge location. Typically, the collection member will have a discharge location to discharge collected food. In one embodiment, the discharge location is the food dispensing chute. The collecting member may be a rotatable food collecting wheel having an open central area and an outer circular rim having a plurality of open compartments spaced apart about the circular rim that extend inwardly from the circular rim and that are open towards the rim interior. The rotatable food dispensing member and the rotatable food collecting member can be rotatable in one direction to discharge food at a discharge location and into a food dispensing chute and can be rotatable in an opposite direction to discharge the food at a second discharge location which may be to a waste chute. The discharge to the waste chute feature can be activated, for example, when the food is held in the dispensing device for too long a period of time.

[0061] The packaging device may also include an automated seasoning device for depositing a predetermined quantity of seasoning to food contained in the packaging device.

[0062] In accordance with another aspect of the invention, the device for applying seasoning includes a seasoning delivery tube having an inlet and a discharge location. A seasoning delivery head is positioned to deliver seasoning to the food to be seasoned with the head in communication with the outlet of the delivery tube and located below the inlet of the delivery tube. Structure is provided for depositing a predetermined quantity of seasoning into the inlet of the delivery tube so that the quantity of seasoning falls by

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gravity through the delivery tube and into and through the seasoning head and onto the food to be seasoned. Typically, the structure for depositing the predetermined quantity of seasoning will receive seasoning from a bulk hopper by gravity feed. The quantity of seasoning to be dispensed can be determined volumetrically, for example

BRIEF DESCRIPTION OF THE DRAWINGS

[0063] FIG. 1 is a perspective view of an automated food processing system in accordance with the invention;

[0064] FIG. 2 is a perspective view of an alternate embodiment of a food processing system in accordance with the present invention;

[0065] FIG. 3 is a schematic view, partly in section, of the food processing system of FIG. 1;

[0066] FIG. 4 is a side elevation view of a portion of a bulk food dispensing device in accordance with the present invention;

[0067] FIG. 4A is a side elevation view, partly in section, of an alternative embodiment for a portion of the dispensing device illustrated in FIG. 4;

[0068] FIG. 5 is a top plan view of a portion of the bulk food dispensing device in accordance with the present invention;

[0069] FIG. 6 is a side elevation view, partly in section, of a bulk food dispensing device in accordance with the present invention and also illustrating a portion of a device for frying food in accordance with the present invention;

[0070] FIG. 7 is a perspective view of a magazine-type dispenser that can form part of the food dispensing device of the present invention;

[0071] FIG. 8 is a partial side elevation view of the magazine dispenser of FIG. 7;

[0072] FIG. 9 is a perspective view of a magazine-type dispenser array that can be utilized in the dispenser of the present invention;

[0073] FIG. 10 is a fragmentary view of the device of FIG. 9;

[0074] FIG. 11 is a top plan view of a food frying device in accordance with the present invention;

[0075] FIG. 12 is a front elevation view of the food frying device of FIG. 11;

[0076] FIG. 13 is a partial fragment sectional view along line 13-13 of FIG. 11;

[0077] FIG. 14 is a fragmentary sectional view of a portion of the food frying device of FIG. 11;

[0078] FIG. 15 is a sectional view along line 15-15 of FIG. 14;

[0079] FIG. 16 is a perspective view of a drive mechanism for the food frying device of FIG. 11;

[0080] FIG. 17 is a fry basket for use in the frying device of FIG. 11;

[0081] FIG. 18 is a fragmentary sectional view along line 18-18 of FIG. 17;

[0082] FIG. 19 is an enlarged, fragmentary elevation sectional view of a portion of FIG. 13;

[0083] FIG. 20 is an alternate view along line 13-13 of FIG. 11;

[0084] FIG. 21 is a sectional view along line 21-21 of FIG. 20;

[0085] FIG. 22 is an enlarged fragmentary view of a portion of FIG. 21;

[0086] FIG. 23 is an alternate embodiment of a fry wheel in accordance with the present invention;

[0087] FIG. 24 is another alternate embodiment fry wheel in accordance with the present invention;

[0088] FIG. 25 is a front perspective view of a packaging device in accordance with the invention;

[0089] FIG. 26 is a rear perspective view of the device of FIG. 25;

[0090] FIG. 27 is a top plan view of the device of FIG. 25;

[0091] FIG. 28 is a side elevation view, partially in section and partially broken away of the packaging device of FIG. 25;

[0092] FIG. 29 is a front elevation view of the device of FIG. 25;

[0093] FIG. 30 is a front perspective view of a portion of an automated container handling system in accordance with the invention;

[0094] FIG. 31 is a top plan view of the container handling system of FIG. 30;

[0095] FIG. 32 is a side elevation view, partially broken away of the automated container handling system of FIG. 30;

[0096] FIG. 33 is a rear elevation view of the container handling system of FIG. 30;

[0097] FIG. 34 is a front perspective view of the container handling system of FIG. 30 shown in another operative position;

[0098] FIG. 35 is a top plan view of the container handling system of FIG. 34;

[0099] FIG. 36 is a side elevation view, partially broken away of the container handling system of FIG. 34;

[0100] FIG. 37 is a rear elevation view of the container handling system of FIG. 34;

[0101] FIG. 38 is a front elevation view of a portion of a container handling apparatus in accordance with the invention;

[0102] FIG. 39 is a front elevation view of another portion of the container handling apparatus of FIG. 34;

[0103] FIGS 40-42 illustrate a front diagrammatic elevation view illustrating a portion of the container handling apparatus in accordance with the invention;

[0104] FIGS 43-44 illustrate a side elevation view, partly in section, of a portion of the food packaging apparatus in accordance with the invention;

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[0105] FIG. 45 is a top plan view of a food packaging device in accordance with the present invention;

[0106] FIG. 46 is a perspective view of a container-receiving receptacle in accordance with the present invention;

[0107] FIG. 47 is a top plan view of the device of FIG. 47;

[0108] FIG. 48 is a sectional view along line 48-48 of FIG. 47;

[0109] FIG. 49 is a cross-sectional view along line 49-49 of FIG. 47 and further including a portion of a conveyor system in accordance with the present invention;

[0110] FIG. 50 is a sectional view along line 50-50 of FIG. 49;

[0111] FIG. 51 is a front elevation view of a carton useful in accordance with the present invention;

[0112] FIG. 52 is a rear elevation view of a carton useful in accordance with the present invention;

[0113] FIG. 53 is a sectional view along line 53-53 of FIG. 52;

[0114] FIG. 54 is a bottom plan view of the container of FIG. 51;

[0115] FIG. 55 is a sectional view along line 55-55 of FIG. 57;

[0116] FIG. 56 is a perspective view showing use of the food container of FIG. 51;

[0117] FIG. 57 is a perspective view of a food container useful in accordance with the present invention;

[0118] FIG. 58 is an alternate embodiment perspective view of a container useful in accordance with the invention;

[0119] FIG. 59 is a development view of the carton of FIG. 51;

[0120] FIG. 60 is a side elevation view of the carton of FIG. 51;

[0121] FIG. 61 is a sectional view of a portion of the food packaging device of FIG. 25;

[0122] FIG. 62 is a sectional view of a portion of a food storage device in accordance with the present invention;

[0123] FIG. 63 is a sectional view of the food storage device of FIG. 62;

[0124] FIG. 64 is a side elevation view, partly in section, a hood system in accordance with the present invention;

[0125] FIG. 65 is a perspective view of an automated seasoning device in accordance with one aspect of the invention;

[0126] FIG. 66 is a side elevation view of the seasoning device of FIG. 65;

[0127] FIG. 67 is a front elevation view of the seasoning device of FIG. 65;

[0128] FIG. 68 is a top plan view of the seasoning device of FIG. 65;

[0129] FIG. 69 is a diagrammatic view of a control system in accordance with the present invention;

[0130] FIG. 70 is a diagrammatic view of a control system in accordance with the present invention;

[0131] FIG. 71 is a diagrammatic view of a frying cycle in accordance with the present invention;

[0132] FIG. 72 is a schematic illustration of a sample touch screen monitor useful in accordance with the invention; and

[0133] FIG. 73 depicts another touch screen layout in accordance with the present invention

DETAILED DESCRIPTION OF THE INVENTION

[0134] General

[0135] In accordance with the present invention, an automated food processing system and method is provided. The automated food processing system and method in accordance with the invention allows food to be dispensed, fried and packaged in a suitable container or alternatively dispensed to a food holding area for subsequent processing by a human operator.

[0136] Referring to the Figures generally and in particular to FIGS. 1 and 3, there is illustrated an automated food processing system 100 in accordance with the invention. Automated food processing system 100 includes a food dispensing device 200, a fry device 400 and a food packaging device 600. In accordance with one embodiment of the present invention, each of dispensing, fry and packaging devices 200, 400 and 600, respectively, can be constructed and are sometimes illustrated in "modular" construction or form. By "modular" construction or form it is meant that dispensing, fry and packaging devices 200, 400 and 600, respectively, can exist and be contained in separate cabinets, for example, and also operate independently of the other devices. Thus, if one of dispensing, fry and packaging devices 200, 400 and 600, respectively, are inoperative or are otherwise deactivated, the function of the deactivated or inoperative device can be performed manually. For example, food to be fried could be manually dispensed in place of dispensing device 200. Alternatively, food to be fried could be fried in a conventional fry vat after being dispensed from dispensing device 200 in place of using fry device 400 and food that is dispensed and fried in dispensing and fry devices 200 and 400, respectively, could, in turn, be packaged manually, for example.

[0137] To facilitate such modular construction and use, each of dispensing, fry and packaging devices 200, 400 and 600, respectively, can be contained in a separate wheeled cabinet, 202, 402 and 602, respectively, as illustrated in FIG. 1. Alternatively, dispensing, fry and packaging devices 200, 400 and 600, respectively, could be mounted as a single unit or in a single cabinet or in "non-modular form," as desired, or more than one of such devices 200, 400 and 600 could be so mounted or combined.

[0138] A suitable control system for the dispensing, fry and packaging devices is also provided. As will be described more completely hereafter, in one embodiment, the control system includes a central control system 110 that can interface with a point-of-sale system 112. The central control system will communicate with separate subcontrol systems 114, 116 and 118, one for each of the dispensing, fry and

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packaging devices 200, 400 and 600, respectively. Alternatively, a single central control system (not shown) could be utilized in place of individual control systems for each of devices 200, 400 and 600. Similarly, as another alternative, a single central control system could be utilized to control the overall operation of automated food processing system 100 as well as controlling the individual functions and aspects of dispensing, fry and packaging devices 200, 400 and 600.

[0139] The basic operations of dispensing device 200, fry device 400 and food packaging device 600 will now be briefly discussed and discussed in detail hereafter.

[0140] Briefly, dispensing device 200 functions to dispense a quantity of food to be fried to fry device 400. In one aspect of the invention, any suitable food dispensing device can be utilized. Dispensing device 200 can include a cabinet 202 to house the components of dispensing device 200. In one embodiment, cabinet 202 will be refrigerated, preferably below 32° F so that the food contents therein will remain frozen. This allows the food stored in dispensing device 200 to remain therein for a long period of time, much longer than if the contents were merely refrigerated (above freezing) or merely at room temperature.

[0141] In the illustrated embodiment, dispensing device 200 includes an uncooked bulk food dispensing container 204. Uncooked bulk food dispensing container 204 may be utilized for food such as French fries or chicken nuggets, for example. Other types of food may also be contained in a dispenser such as uncooked bulk food dispensing container 204. Typically, those types of food would be in the form of relatively small pieces compared to relatively large food pieces such as chicken patties, for example.

[0142] For relatively large food pieces, a large food dispensing container is utilized. In one embodiment, the large food dispensing container is in the form of a magazine food dispenser 206.

[0143] Food dispensed from a dispenser of dispensing device 200 is deposited on a conveyor 208 that, in turn, directs the deposited food to a secondary or dump container 210 for subsequent discharge from dispensing device 200.

[0144] In the illustrated embodiment, uncooked bulk food dispensing container 204, magazine food dispenser 206, conveyor 208 and secondary container 210 are contained in cabinet 202, which is a refrigerated environment, preferably maintained below freezing (32° F or lower).

[0145] While any suitable conveyor can be utilized in one aspect, conveyor 208 is preferably a vibratory conveyor, vibrated by a suitable vibratory mechanism that vibrates a conveyor body 214. Conveyor body 214 may take the form of a suitably shaped tray, for example.

[0146] By containing the foregoing components in a refrigerated and preferably frozen environment, consistency in food preparation and dispensing is achieved, thereby contributing to the overall efficient, effective and uniform performance of automated food processing system 100.

[0147] Secondary container 210 can be of a form as desired and includes suitable weighing mechanism 216 to permit a determination of the quantity of food contained in secondary container 210. Weighing mechanism 216 can be any suitable device to weigh the contents or otherwise

determine the amount of food in secondary container 210. Weighing mechanism 216 may comprise a load cell or a mechanism for determining the volume of food deposited into secondary container 210, for example. In this manner, the amount of food that is charged to fry device 400 at a particular time can be determined. In addition, weighing mechanism 216 can be operated during operation of conveyor 208 and the operation of conveyor 208 continued until a desired amount of food is deposited in secondary container 210. In this manner, a precise amount of food can be delivered to secondary container 210 thereby permitting consistency and uniformity in the portion of food that is delivered to fry device 400. This is also important to ensure that a sufficient quantity of food is being cooked by automated food processing system 100.

[0148] Prior to activation of dumping mechanism 218, discharge door 220 of cabinet 202 is opened by operation of a door opening device which can be any suitable device as desired and in the illustrated embodiment is a cylinder 222 attached to discharge door 220 and moveable up and down in the direction of arrow B. Cabinet 202 is preferably insulated with a suitable insulating material 224 that is also provided in discharge door 220. The provision of a suitable insulating material is important, particularly since dispensing device 200 will typically be located proximate or adjacent fry device 400 that operates at a substantially elevated temperature, thereby typically generating substantial heat.

[0149] In the illustrated embodiment, dispensing device 200 includes four dispensing lanes from which food is discharged from dispensing device 200 and to a suitable location such as fry device 400. After dispensing through discharge door 220, cylinder 222 is activated to close discharge door 220. Similarly, dumping mechanism 218 of secondary container 210 is activated to return secondary container 210 to its upright position to receive more food.

[0150] Fry device 400 includes a fry wheel 404, a fry vat 406 for containing and heating a suitable cooking oil and a drive mechanism 408 for suitably rotating fry wheel 404. It is to be understood that in accordance with one aspect of the invention any suitable frying device can be utilized.

[0151] In the illustrated embodiment of FIGS. 3 and 11-16, fry device 400 includes a plurality, in this case four, of separate fry wheels 404, 410, 412 and 414, as well as four separate fry vats 416, 406, 420 and 418 and a separate drive mechanism 408 for each fry wheel, each dedicated to a particular one of fry wheels 404, 410, 412 and 414.

[0152] In one embodiment, a separate drive mechanism is provided for each of fry wheels 404, 410, 412 and 414 and can be suitably located in cabinet 402, preferably in a location that is above the level of cooking oil present in the associated one of fry vats 416, 406, 420 and 418, respectively.

[0153] The suitable rotation of each of fry wheels 404, 410, 412 and 414 can be as desired to direct food articles loaded therein down and through the fry vat until reaching the other side of the fry vat whereupon the food articles are discharged. The rotation can be either continuous or a periodic incremental rotation. For example, a suitable drive mechanism can be provided to periodically rotate fry wheel 410 in a desired rotational increment, which may be based on the number of compartments contained in fry wheel 410.

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In the illustrated embodiment of FIG. 13, for example, fry wheel 410 comprises eight food compartments 422, 424, 426, 428, 430, 432, 434, and 436. Each of food compartments 422-436 is a perimeter food compartment and open to the perimeter or exterior of fry wheel 410. Each of fry wheels 404, 412 and 414 can be similarly configured.

[0154] As described in more detail hereafter, each of compartments 422-436 is formed from a perforated curved compartment forming member 510.

[0155] In the rotation of fry wheel 410, a periodic incremental rotation can be based upon 360° divided by the number of compartments. Thus, for example, in the illustrated embodiment of FIG. 13, each periodic rotation would consist of a rotation of 360° divided by eight compartments or a periodic rotation increment of 45°. Thus, as illustrated in FIG. 13, the food contained, in this case French fries, in compartments 424-430 would remain in cooking oil 454 contained in fry vat 406 for all or part of four incremental rotations, after which the food would be discharged from fry wheel 410 in the next incremental rotation thereof. For example, as illustrated in FIG. 13, compartment 422 is ready to receive a charge of food to be fried, compartment 424 has a charge of food that has been just immersed in cooking oil 454. Cooking oil 454 is at a level H as illustrated in FIG. 13, which is dependent upon the amount of food contained in compartments 422-436 that are submerged in cooking oil 454.

[0156] Similarly, compartment 426 has food contained therein that has gone through two incremental 450 rotations of fry wheel 410, compartment 428 has food contained therein that has undergone three incremental rotations and food compartment 430 has food contained therein that has undergone four incremental rotations of fry wheel 410 and compartment 432, which is now empty, has discharged the food contained therein upon the last incremental rotation of fry wheel 410. Thus, upon the next incremental rotation of fry wheel 410, which is in the clockwise direction as shown by arrow B of FIG. 13, the food contained in food compartment 430, which in this case is a quantity of French fries 455, will be discharged from compartment 430 to the food packaging device which is hereafter briefly described.

[0157] Upon discharge of food, which in this case is a quantity of French fries from one of compartments 422-436 of a fry wheel, such as fry wheel 410 as illustrated in FIG. 3, the food is deposited onto an inlet chute 604 of food packaging device 600.

[0158] From inlet chute 604, the food from inlet chute 604 received from fry wheel 410 is deposited into rotatable food dispensing member 606. Typically, rotatable food dispensing member 606 will be compartmented into a plurality of compartments that are arrayed along the periphery of rotatable food dispensing member 606.

[0159] Rotatable food dispensing member 606 has a discharge location to discharge the food deposited therein. The discharge location is generally located towards an upper portion of rotatable food dispensing member 606. A food dispensing chute mechanism 608 is positioned to receive cooked food from the discharge location of rotatable food dispensing member 606. In a preferred embodiment, food dispensing chute mechanism 608 incorporates a device for weighing or otherwise determining the quantity of food that

has been deposited into food dispensing chute mechanism 608. This ensures that when food is dispensed from food dispensing chute mechanism 608 a minimum quantity of food will be dispensed, thereby ensuring that a container 611 or other package that is to receive the food from mechanism 608 will receive a desired charge.

[0160] Food packaging device 600 preferably also includes a suitable automated container handling system 610. Automated container handling system 610 is capable of, in a preferred embodiment, selecting container 611 of a desired size, retrieving and grasping container 611, erecting unerected container 611 into an erected form and holding the erected container 611 in position to receive food dispensed from food dispensing chute mechanism 608.

[0161] After food container 611 receives food from food dispensing chute mechanism 608, automated container handling system 610 is capable of moving container 611 having food deposited therein to a container receiving receptacle 612 which receptacle 612 can be transported via a conveyor system 614 to a desired location for subsequent pickup of container 611 having food contained therein by a human operator, for example.

[0162] Preferably, a food overflow collection member is provided to collect any food dispensed by food dispensing chute mechanism 608 that is not deposited into container 611. In one embodiment, the overflow food collection device is a rotatable food collection member 613. Overflow food collection member 613 functions to collect food dispensed by food dispensing chute mechanism 608 that is not received in container 611 and to recycle food collected by overflow food collection member 613 into food dispensing chute mechanism 608 for subsequent dispensing to a container in a first-in, first-out manner so that overflow food is promptly recycled to dispensing chute 608 for dispensing to a container.

[0163] Preferably, food packaging device 600 is configured to include a provision by which food contained in dispensing device 600 is routed to waste where it is not desired to dispense such food into a food container. Such a condition could arise, for example, if food is held for too long a period in food packaging device 600. This function may be accomplished, for example, by providing a waste discharge location which can be in the form of a waste chute 615 to which food from rotatable food dispensing member 606 and overflow food collection member 613 can be directed. In one embodiment, chute mechanism 608 is lowered and member 606 is rotated to dispense food to chute mechanism 608, which in turn dispenses into member 613. Member 613 is rotated counterclockwise to deliver food to waste chute 615. This process can be continued until all of the food in device 600 is so emptied, if desired.

[0164] Preferably, a suitable structure for applying a desired quantity of seasoning to food contained in food packaging device 600 is provided. In the embodiment illustrated in FIG. 3, a food seasoning device 616 is provided. Food seasoning device 616 can be any suitable seasoning device as desired. In one embodiment, food seasoning device 616 dispenses a desired quantity of seasoning from a bulk storage container through a delivery tube and onto food located in rotatable food dispensing member 606.

[0165] Preferably, and in the embodiment illustrated in FIG. 3, a food seasoning device 616 is provided that directs

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a desired quantity of seasoning onto food that is contained in a bottom portion of rotatable food dispensing member 606 and inlet chute 604 via a seasoning dispensing head 618

[0166] Preferably, conveyor system 614 is composed of a raceway 620 that is an endless loop around the periphery of the top surface of cabinet 602 of food packaging device 600, which in one embodiment can be a modular, wheeled cabinet. Conveyor system 614 causes container receiving receptacle 612 to travel around raceway 620 to a food container pickup location 622 where a human operator can pickup food containers having food therein. Preferably, conveyor system 614 includes structure for stopping movement of a container/receiving receptacle 612 at a predetermined location when carrying a food container, such as at food container pickup location 622. Such structure in one embodiment may comprise a gate structure 928 or 928' of FIG. 45 and FIGS. 25-27, respectively, that extends across at least a portion of raceway 620 in the vicinity of the predetermined location. Any suitable type of barrier structure can be utilized to prevent the desired movement. Most preferably, gate structure 928 or 928' will be located at a height that is above the top of the receptacle when located on conveyor system 614 so that movement of container/receiving receptacle 612 is prevented or stopped only for a receptacle 612 that has a food container 611 disposed thereon. Note that the pickup location can be configured as desired and slightly different configurations 622 and 622' are shown in FIG. 45 and FIGS. 25-27, respectively.

[0167] Referring to FIG. 2, there is illustrated an alternate embodiment of an automated food processing system 101 in accordance with the invention. Automated food processing system 101 includes a food dispensing device 201 which is similar to food dispensing device 200, previously briefly described, where like reference numerals represent like elements. Food dispensing device 201 includes fewer uncooked bulk food dispensing containers 204 and additional magazine food dispensers that are similar to magazine food dispenser 206, previously referred to. Otherwise, dispensing device 201 is similar to dispensing device 200 previously described.

[0168] Automated food processing system 101 also includes fry device 400, which has been described.

[0169] One primary distinction between automated food processing system 100 and automated food processing system 101 is that automated food processing system 101 does not include an automated packaging device such as automated packaging device 600. In place of food packaging device 600, a food storage device 635 is provided. Food storage device 635 allows food cooked by food frying device 400 to be stored in a heated environment for subsequent manual processing. As configured in FIG. 2, food storage device 635 includes separate heated product receiving receptacles 637, 639, 641 and 643. Each receptacle 637, 639, 641 and 643 is dedicated to receiving food from a respective one of fry wheels 410, 412, 414 and 404, respectively. In addition, each receptacle 637-643 can have placed therein a suitable container to receive food, such as handled trays 645, 647, 649 and 651.

[0170] As illustrated in FIG. 2, a food item F is being discharged from fry wheel 414 down a chute 653 and into handled tray 649 contained within heated receptacle 641. Food item F can be stored therein for a period of time until it is ready for subsequent processing.

[0171] Food Dispensing Device

[0172] Referring to the Figures generally and in particular to FIGS. 1-10, there is illustrated various embodiments of food dispensing devices and portions thereof in accordance with the invention.

[0173] In one embodiment, food dispensing device 200 is illustrated or partially illustrated in FIGS. 1 and 3-8. Food dispensing device 200 includes a cabinet 202, bulk uncooked food dispensing containers 204, 205 and 207, magazine food dispenser 206, 209, 211 and 213, and a suitable conveyor system for each lane 234, 236, 238 and 240 of food dispensing device 200. Any suitable number of magazine dispensers can be used for a particular lane, such as one, two, three, four, five or more, and the illustrated embodiment of four is merely an example. As configured in FIG. 1, for example, lane 234 receives material from bulk hopper 204, lane 236 receives food material from bulk hopper 205, lane 238 receives food material from bulk hopper 207 and lane 240 receives dispensed food from magazine food dispensers 206, 209, 211 and 213 as will be described hereinafter in greater detail, particularly with respect to food dispensing device 201 of FIG. 2, for example.

[0174] Each lane 234, 236, 238 and 240 dispenses food that is subsequently directed to fry wheels 410, 412, 414 and 404, respectively.

[0175] The components of lane 238 will now be described in detail and it is to be understood that the components of lanes 234 and 236 are similar. Lane 238 includes uncooked bulk food dispensing container 207 and a food handling system 242 which in this embodiment is identical for each lane 234, 236, 238 and 240 as well as for each lane of food dispensing device 201. It should be noted that food handling system 242, as for example, illustrated in FIGS. 3-6 is depicted with respect to lane 240 and that food handling system 242 is the same for each lane 234, 236, 238 and 240.

[0176] Food handling system 242 includes conveyor system 208, secondary container 210, weighing mechanism 216 and dumping mechanism 218. Conveyor system 208 includes vibratory mechanism 212 and conveyor body 214.

[0177] Uncooked bulk food dispensing container 204 can be of a shape and dimension generally as desired. Preferably, uncooked bulk food dispensing container 204 has an upper opening to permit a supply of food to be placed in uncooked bulk food dispensing container 204. Upper opening 244 as illustrated is located in an upper rear portion of uncooked bulk food dispensing container 204 and can be conveniently accessed via a rear door 246 of cabinet 202. Rear door 246 preferably is insulated with suitable insulation material 224.

[0178] Uncooked bulk food dispensing container 204 is composed of a pair of opposed upper sidewalls 248, a pair of generally opposed lower sidewalls 250 and front and rear walls 252 and 254, respectively, which connect together upper sidewalls 248 and 250 to provide uncooked bulk food dispensing container 204. Front sidewall 252 includes a lower portion 252' that extends inwardly from top to bottom to further facilitate discharge of food contained in uncooked bulk food dispensing container 204. Preferably, lower generally opposed sidewalls 250 are slightly indented from top to bottom to facilitate the discharge of food that may be contained therein.

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[0179] Uncooked bulk food dispensing container 204 includes a bottom opening 256 that permits the discharge of food contained therein. Bottom opening 256 can be configured as desired and in the illustrated embodiment the entire bottom of uncooked bulk food dispensing container 204 is open. In the illustrated embodiment, uncooked bulk food dispensing container 204 is particularly suited for use with food such as French fries and chicken nuggets as well as other types of food of relatively small size.

[0180] Uncooked bulk food dispensing container 204 is suitably mounted within cabinet 202. While a suitable mounting structure can be utilized, it is preferred to utilize a structure that will minimize heat transfer from the exterior and through cabinet 202 to uncooked bulk food dispensing container 204, particularly where cabinet 202 is refrigerated, especially where temperatures below freezing are utilized. In that regard, front mounting bracket 258 and rear mounting bracket 260 each are configured to minimize heat transfer from cabinet 202 to uncooked bulk food dispensing container 204. In that regard, front mounting bracket 258 and rear mounting bracket 260 include openings, 258' and 260', respectively, to minimize such heat transfer and to maximize airflow around the containers 204, 205, 207 and dispensers 206, 209, 211 and 213. Similarly, materials of low thermal conductivity can also be utilized, if desired, for brackets 258 and 260. Generally, to minimize heat transfer and to maximize airflow, the surface area contact and cross-sectional area of mounting brackets 258 and 260 should be minimized to reduce heat transfer and "hot spots" on uncooked bulk food dispensing container 204.

[0181] As illustrated in FIGS. 3 and 4, for example, food contained in uncooked bulk food dispensing container 204 passes through bottom opening 256 and onto conveyor body 214 which in the illustrated embodiment is a suitably dimensioned pan. Conveyor body 214 is suitably mounted to vibratory mechanism 212 to effect vibration of conveyor body 214 as well as food contained therein and food contained in uncooked bulk food dispensing container 204, and in particular the lower portion of container 204. This vibration facilitates the discharge of food from uncooked bulk food dispensing container 204 and causes food contained in conveyor body 214 to travel in the direction of arrow G. Any suitable conveyor system can be used in accordance with one aspect of the invention.

[0182] A preferred type of vibratory mechanism is available from FMC Technologies, Inc. of Chicago, Ill. marketed under the model F-010-B and DF-010-B. Vibratory mechanism 212 is preferably an electromagnetic vibrating mechanism. Vibratory mechanism 212 in one embodiment produces a vibrating stroke at the surface of conveyor body 214. The stroke results from the action of an electromagnet that pulls conveyor body 214 sharply down and backward and then allows it to spring up and forward. Typical vibratory mechanisms of this type run at about 3,600 vibrations/minute at 60 Hz power. The power of the vibrating stroke can be controlled by a suitable drive module as is known in the art. In one embodiment, vibratory mechanism 212 can be operated at about 85% of full power during filling of secondary container 210 with food. For the first part of a fill cycle of secondary container 210, vibratory mechanism 212 can be run continuously, then pulsed by turning its power on and off periodically so that vibratory mechanism 212 operates about 50% of the time to finish filling secondary

container 210 with a desired quantity of food, thereby providing better control on the last part of the food charged to secondary container 210.

[0183] Food dispensing device 200 preferably includes a suitable mechanism to determine the weight or volume of a charge of food delivered by conveyor system 208 to secondary container 210. The amount may be determined either by weight or volume, for example. In the illustrated embodiment, weighing mechanism 216 is operatively interfaced with secondary container 210 to provide an indication of the weight of food contained in secondary container 210. The weight sensed in secondary container 210 by weighing mechanism 216 is communicated with control system 114 of food dispensing device 200. Control system 114 monitors and controls the operative functions of food dispensing device 200 as hereinafter described in greater detail.

[0184] Optionally, a level sensor can be employed in uncooked bulk food dispensing container 204 to provide an indication of the amount of food stored therein that is available for dispensing. Any suitable level indicator known in the art can be utilized in accordance with the invention such as photoelectric, weight, turning fork and others, for example.

[0185] Secondary container 210 can be considered as a dump container and as associated therewith, dumping mechanism 218 for rotating secondary container 210 through an arc as indicated by arrow B sufficiently to dump the contents of secondary container 210. Any suitable dumping mechanism can be utilized. Illustrated dumping mechanism 218 includes a dump cylinder 264 that is secured to a base 266. Dump cylinder 264 can selectively rotate a drive gear or wheel 268 that, in turn, is operatively associated with a follower gear or wheel 270 to cause rotation of follower gear or wheel 270. Secondary container 210 is rigidly secured to follower gear or wheel 270 so that when follower gear or wheel 270 is rotated by drive gear or wheel 268 secondary container 210 is rotated through an arc that causes secondary container 210 to rotate forward to a dumping position as illustrated in phantom lines in FIG. 3 indicated by reference numeral 210'. Such movement is caused by extension of dump cylinder 264. Similarly, retraction of dump cylinder 264 moves secondary container 210 from the dump position indicated by reference numeral 210' to the upright position indicated by reference numeral 210 in FIG. 3 where secondary container 210 is ready to receive a charge of food from conveyor system 208, which in the illustrated embodiment the food is French fries FF.

[0186] An alternative embodiment for secondary container 210 is illustrated in FIG. 4A. Secondary container 210' is composed of a pair of opposed spaced apart sidewalls 211 (only one sidewall 211 is illustrated and is depicted in a half-moon configuration) and a pair of sidewalls 213a and 213b, oriented in a V-shaped relationship when container 210' is configured to receive food from conveyor body 214. Sidewall 213a is mounted for pivotal movement about apex 215 of sidewalls 213a and 213b. Such movement is accomplished by a drive mechanism similar to cylinder 264, drive gear 268 and driven gear 270, which in this embodiment are cylinder 264', drive gear 268' and driven gear 270', which gear 270' is attached to sidewall 213a. When cylinder 264' is extended, sidewall 213a is caused to pivot downwardly as indicated by arrow AA to the position of sidewall 213a

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shown in phantom, thereby causing the contents (French fries FF) of container 210' to be dumped. Sidewalls 211 act as sidewall guides for sidewalls 213a and 213b when sidewall 213a is in a lowered position, in which case sidewalls 213a and 213b act as a chute or slide

[0187] Control system 262 coordinates the operation of the various functions of food dispensing device 200. For example, when food dispensing device 200 is ready to dump a charge of food from secondary container 210 out of food dispensing device 200, control system 262 activates cylinder 222 to open discharge door 220 thereby permitting the food charge in secondary container 210 to be dumped by dumping mechanism 218 through open discharge door 220. After dumping of the food charge is completed, control system 114 causes dump cylinder 264 to be retracted thereby returning secondary container 210 to a position ready to accept a further charge of food from conveyor system 208. Cylinder 222 has one end rigidly secured to cabinet 202 or some other suitable location and the other end of cylinder 222 is attached to discharge door 220. Typically, discharge door 220 will have a suitable guide mechanism, which may be tracks, slots or other suitable apparatus to guide discharge door 220 to its open and closed positions. Cylinder 222 is operable to move door 220 up and down as indicated by arrow B in FIG. 6 to thereby open and close discharge door 220 as desired. In the illustrated embodiment, discharge door 220 extends across all four dispensing lanes 226, 228, 230 and 232. If desired, a separate discharge door could be provided for each of dispensing lanes 226, 228, 230 and 232. In addition, control system 262 causes activation of cylinder 222 to close discharge door 220 to prevent heat from entering into cavity 272 of food dispensing device 200 in which the food and various dispensing mechanisms are contained as illustrated in FIGS. 3 and 6, for example

[0188] Food dispensing device 200 can contain suitable refrigeration components 274 such as within a lower portion of cabinet 202 as shown schematically in FIG. 1. In accordance with the preferred embodiment of food dispensing device 200, refrigeration components 274 provide sufficient cooling to provide a below freezing temperature environment in cavity 272. Alternatively, suitable refrigeration components can be provided exteriorly of cabinet 202 and even at a remote location as desired. In addition, a storage compartment 276 and a storage compartment door 278 may also be provided in cabinet 202. An upper side access door may also be provided to permit operator access to the interior of cavity 272 where uncooked bulk food dispensing containers 204 and/or magazine food dispensers 206 and/or 209, 211 and 213 are located

[0189] Referring to FIGS. 2 and 7-10, there is illustrated another embodiment of food dispensing device 201 in accordance with the present invention

[0190] Food dispensing device 201 has many similarities to food dispensing device 200 previously described where like reference numerals represent like elements. Thus, food dispensing device 201 includes cabinet 202, four product dispensing lanes 226, 228, 230 and 232 with each such lane incorporating conveyor system 208, secondary container 210, vibratory mechanism 212, conveyor body 214, weighing mechanism 216, dumping mechanism 218, discharge door 220, cylinder 222, insulating material 224, food handling system 242, upper opening 244, rear door 246,

uncooked bulk food dispensing container 204 which is associated with product dispensing lane 234, a dump cylinder 264 for each product dispensing lane, cavity 272, refrigeration components 274, storage compartment 276 and a storage compartment door 278. Product dispensing lanes 228, 230 and 232 each have associated therewith a plurality of magazine food dispensers 280-308 arrayed to provide in the embodiment illustrated in FIG. 9 five magazine food dispensers per product dispensing lane in which there are three product dispensing lanes serviced by the foregoing magazine food dispensers. Consequently, magazine food dispensers are configured in a three-by-five array and are suspended from a magazine food dispenser support 310 as shown in FIG. 9. Each row of three magazine food dispensers depends from magazine food dispenser support 310 via a slide assembly 312. Slide assembly 312 is similar to a drawer slide including a pair of first and second elongated telescoping left and right slides 314 and 316, respectively. Suitable upper rollers 318 are mounted to magazine food dispenser support 310 and lower rollers 320 depend from magazine food dispensers 280-308 for traversing left and right elongated telescoping slides 314 and 316.

[0191] Suitable mounting brackets 322 are provided which depend upwardly from magazine food dispenser support 310 for mounting to cabinet 202

[0192] In addition, suitable mounting brackets 324 are provided which depend downwardly from magazine food dispenser support 310 for mounting slide assembly 312 thereto allowing magazine food dispensers 280-308 to depend therefrom.

[0193] Magazine food dispenser support 310 has a series of holes 326 and 328 therein. Holes 326 can be provided to allow increased airflow and cooling. Holes 328 can also be provided to provide increased airflow and cooling for magazine food dispensers 280-308.

[0194] Each of magazine food dispensers 280-308 and 206, 209, 211 and 213 briefly discussed with respect to food dispensing device 200 are similar in construction. Magazine food dispenser 206 will be discussed with respect to FIGS. 7 and 8 and it is to be understood that the other magazine food dispensers are of similar construction.

[0195] Magazine food dispenser 206 includes a body or housing 330 that includes sidewalls 332 and 334, front walls 336 and 338 and corresponding rear walls (not shown) and can be attached in a removable manner if desired, including in a snap-on arrangement to facilitate cleaning. Magazine food dispenser 206 also includes a top member or cover 340 having mounted thereover a drive mechanism 342. Drive mechanism 342 includes a drive gear or wheel 344 and a driven wheel or gear 346. Depending from each of drive wheel or gear 344 and driven wheel or gear 346 is a spiral flight that is vertically or generally vertically oriented relative to the longitudinal axis of spiral flights 348 and 350. If desired, a single spiral flight dispenser (not shown) could also be utilized.

[0196] Body 330 of magazine food dispenser 206 can include substantial open portions such as front open portion 352 and a corresponding rear open portion (not shown). Such open portions may have a cover or access door thereover (not shown). Such open portions can be desirable to permit airflow through magazine food dispenser 206 since

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generally such dispenser will be contained in a refrigerated environment and such openings help ensure that food contained therein remains frozen or chilled as desired. A vertical divider (not shown) can be provided between spiral flights 348 and 350 if desired

[0197] A plurality of generally vertically disposed and spaced apart rods 354, 356 and 358 may be provided at the front of magazine food dispenser 206 adjacent spiral flights 348 and 350 and similar rods can be provided at the back of magazine food dispenser 206. Rods 354, 356 and 358 prevent food pieces from falling out of spiral flights 348 and 350 and to maintain spiral flights 348 and 350 in a vertical orientation.

[0198] Magazine food dispenser 206 has an open bottom 360 through which food pieces can be dispensed during operation.

[0199] During operation, drive wheel 344 can be driven by a suitable electric motor, such as an electric motor 362, 364 and 366 shown with respect to magazine food dispensers 280, 282 and 284 in FIG. 9. Alternatively, other drive devices could be used, including, for example, a rotary air or hydraulic cylinder. Rotation of drive wheel 344 in a clockwise direction causes driven wheel 346 to rotate in a counterclockwise direction by virtue of the intermeshing or contact between drive wheel or gear 344 and driven wheel or gear 346. Such rotation causes corresponding rotation of spiral flights 348 and 350, respectively. Food contained by spiral flights 348 and/or 350 is moved downwardly by virtue of such rotation. When such food reaches the bottom of spiral flights 348 and/or 350, respectively, such food is discharged from magazine food dispenser 206 through open bottom 360 and onto conveyor system 208 for handling as previously described. A single motor could be used to drive a plurality of dispensers 280, 282 and 284, etc. through a suitable drive mechanism (not shown).

[0200] As shown in FIG. 8, pieces of food can be contained by magazine food dispenser 206 in two different ways. For example, individual pieces of food may each be contained by a single elongated spiral flight 348 or 350 as shown with respect to food pieces F1 and F2, respectively. Food pieces F1 and F2 can be any type of desired food and may be a food item such as a hash brown, an individual portion pie, rectangular food patty, or other type of food as desired. Chicken nuggets and other food can also be dispensed with the bulk dispenser previously described. Larger items of food can span across portions of both elongated spiral flights 348 and 350 as illustrated with respect to food item F3, which may be a larger food item, such as a chicken patty, or other type of food article as desired. Spiral flights 348 and 350 can be of a desired radial diameter so that the food piece or pieces that are to be contained and dispensed in magazine food dispenser 206 can be accommodated as illustrated in FIG. 8. Each spiral can contain a food piece so that as illustrated in FIG. 7, the illustrated spirals of spiral flights 348 and 350 could each accommodate twelve food pieces such as food pieces F1 or F2 for a total of twenty-four food pieces or twelve food pieces such as food piece F3 of FIG. 8. As will be appreciated, spiral flights having a greater or lesser number of flights can be used if desired to hold a greater or lesser number of food pieces, respectively.

[0201] A suitable home position sensor 362' can be utilized to indicate a home or start position of each of spiral

flights 348 and 350. As illustrated in FIG. 7, a pair of position indicating sensors 362' and 364' are utilized and mounted on drive wheel 344 180° apart for more precise locating of the position of spiral flights 348 and 350. Sensors 362' and 364' can be proximity sensors that align with corresponding sensor pickups on the respective drive gear or motor for magazine food dispenser 206 (not shown).

[0202] Preferably, spiral flights 348 and 350 are offset by one rotation so that a single food item such as food item F1 or F2 in FIG. 8 will be dispensed from one of either spiral flight 348 or 350 for each one-half rotation of spiral flights 348 and 350.

[0203] Preferably, food dispensing device 200 and food dispensing device 201 are constructed in modular form, an example of which is illustrated in FIGS. 1 and 2, respectively. Wheels 368 are provided to permit cabinets 202, 402 and 602 to be suitably transported across a relatively flat surface, such as a restaurant work area floor.

[0204] Food Frying Device

[0205] Referring to the Figures generally, and in particular to FIGS. 1-2 and 11-24, there is illustrated fry device 400 and various components and alternative components thereof in accordance with the invention.

[0206] In one embodiment, fry device 400 includes cabinet 402, four fry wheels 404, 410, 412 and 414, four fry vats 406, 416, 418 and 420, four drive mechanisms 408, one for each of fry wheels 404, 410, 412 and 414. Each fry vat 406, 416, 418 and 420 is dimensioned to contain a desired volume of a suitable cooking oil. Each fry vat 406, 416, 418 and 420 is dedicated to one of fry wheels 404, 410, 412 and 414, respectively.

[0207] In operation in the preferred embodiment, fry device 400 is positioned to receive the food dispensed from a food dispensing device, such as food dispensing device 200 and food dispensing device 201. Consequently, it is advantageous to position fry device 400 adjacent food dispensing device 200 or 201 as illustrated in FIGS. 1 and 2, respectively. A suitable control panel 456 can be provided and located in a suitable location, such as on the side of cabinet 402. In the illustrated embodiment, control panel 456 contains a separate display for each of fry wheels 404, 410, 412 and 414 referred to by reference numerals 456a-d, respectively. Control panels and displays 456a-d can include information such as set cycle time, oil temperature, oil level as well as controls to adjust cycle time and oil temperature, for example.

[0208] Referring to FIG. 13, there is illustrated fry wheel 410. Fry wheel 410 includes two opposed circular spaced apart circular disks 458a and 458b. Disks 458a and 458b can include a plurality of apertures 460 as desired to reduce wheel weight and to provide circulation of cooking oil and to permit passage of water vapor therethrough, such as during frying food products, for example. A fry wheel axle 462 is provided to which disks 458a and 458b are mounted. Axle 462 is suitably mounted, typically and preferably for rotation with respect to fry vat 406 at a location above the normal level of cooking oil or range of levels of cooking oil that will be encountered in fry vat 406 during operation.

[0209] In one embodiment, outer peripheral edge 464 of each of disks 458a and 458b include a plurality of teeth 466

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[0210] Teeth 466 can be utilized to drive fry wheel 410 in a manner as hereinafter described. Referring to FIGS. 14-16, there is illustrated in sectional view of disk 458a of fry wheel 410, a portion of which is located within fry vat 406. A drive wheel 468 is associated in operative position relative to teeth 466 located on outer peripheral edge 464 of disk 458a. Drive wheel 468 can be formed from a disk of material of a suitable thickness having a circumferential groove 470 therein. Circumferential groove 470 is typically at least or slightly greater than the thickness of disk 458a in the area where drive wheel 468 and disk 458a are juxtaposed as illustrated in FIGS. 14 and 15. A series of spaced apart pins 472 extend across circumferential groove 470 and are radially arrayed and spaced from the center of drive wheel 468. Drive wheel 468 includes a central aperture 474 through which a drive axle 476 can be mounted. In operation, drive wheel 468 is rotated by drive axle 476 with drive wheel 468 being positioned a fixed distance from disk 458a so that pins 472 mesh with teeth 466 when rotated as illustrated in FIG. 14 thereby causing rotation of disk 458a and consequently fry wheel 410 in a direction of rotation opposite to the rotation of drive wheel 468, as indicated by arrows K and L of FIG. 14.

[0211] It is to be understood that any suitable drive wheel and drive arrangement can be utilized. For example, in place of drive wheel 468 with pins 472, a drive arrangement could be utilized in which a drive gear is utilized to mesh with a corresponding gear located around the periphery of disk 458a and/or 458b, for example. Alternatively, a friction drive system could be utilized in which a friction drive wheel would contact the edge of one or both of circular disks 458 which could be of a design having no teeth therealong, such as illustrated in alternative embodiment wheels 479 and 481 described hereafter. Since the wheel will have cooking oil thereon, the coefficient of friction between the drive wheel and fry wheel will be decreased. Care should be taken to assure that when using a friction drive, sufficient pressure is maintained between the driving wheel and the fry wheel.

[0212] Referring to FIG. 16, there is illustrated a drive mechanism for driving drive wheel 468. The drive mechanism includes an electric motor 478, a gear reduction drive 480, an output shaft 482, a drive pulley wheel 484, a driven pulley wheel 486 and a drive belt 488 extending around drive pulley wheel 484 and driven pulley wheel 486 to drive axle 476 which thereby drives drive wheel 468 since the end 476a of axle 476 is fixed in aperture 474 with respect to drive wheel 468. A shear pin 490 can be located in a shear pin aperture 492 of drive wheel 468 to retain axle 476 in a fixed position relative to drive wheel 468. Axle 476 is suitably contained within an axle journal 494 which, in turn, is mounted to frame 496 to permit movement of axle 476 relative to axle journal 494 and frame 496. Similarly, motor 478 and gear reduction drive 480 are suitably mounted to frame 496. If desired, motor 478 may be a stepper motor.

[0213] Typically, it is important that the fry wheel is rotated in periodic increments for a compartment to be aligned with a respective discharge slide 498 of fry device 400 or other slide, ramp or discharge location after a periodic rotation. Typically, the leading edge 500 of a compartment bottom, such as compartment bottom 432' of compartment 432 as shown in FIG. 13 is aligned with the upper edge of fry vat 406 or the top edge of discharge chute 498 associated therewith to allow the contents of compartment 432 to be

discharged therefrom. As illustrated in FIG. 13, the contents of compartment 432 have already been discharged from fry wheel 410. This is particularly important where incremental rotation of fry wheel 410 is utilized as opposed to a continuously moving fry wheel. Thus, for incremental rotation it is desirable for bottom edge 500 of compartment 432 to be aligned with discharge 498 or the upper edge 406' of fry vat 406. In order to accomplish this, a stepper motor can be utilized to drive fry wheel 410. Alternatively, or in addition, the position of the baskets can be sensed and their position adjusted accordingly to assure that all baskets are in the correct position for loading and discharge during operation. Also, utilizing location sensors allows use of a simple DC or AC motor, as opposed to a stepper or servo motor. Any suitable sensor can be utilized in conjunction with a control system to control operation of the fry wheel drive motor. Suitable sensors include proximity, magnetic reed, Hall Effect, photoelectric and capacitive sensors. Such sensors are well known in the art and consequently a detailed description of those sensors is not included herein.

[0214] In accordance with another aspect of the invention, it should be understood that the height of cooking oil in one of fry vats 406, 416, 418 and 420, such as the level of cooking oil indicated by reference letter H in FIG. 13 in fry vat 406 will increase or decrease depending upon the amount of food that is submerged underneath the surface of cooking oil contained in fry vat 406. Thus, as illustrated in FIG. 13, compartments 424, 426, 428 and 430 each have a charge of food, in this case French fries 455 contained therein. Each compartment contains approximately one pound of French fries 455. Consequently, there are about four pounds of French fries that are beneath the surface level H of cooking oil contained in fry vat 406. This quantity of submerged food raises the level H of cooking oil in fry vat 406. This increase in the level of cooking oil can cause the food to be submerged and therefore cooked for a longer of period of time in the cooking oil. For example, contrast the level of cooking oil depicted in FIG. 13 with the level of cooking oil depicted in FIG. 20 in which a charge of French fries 455 is contained only within compartment 426. This results in a substantially reduced level of cooking oil H' as indicated in FIG. 20. Thus, the control system for fry device 400 can be adjusted to take into account for different levels of cooking oil which can be sensed by a suitable sensor as is known by those skilled in the art (not shown). Where rotation of fry wheel 410 is done incrementally after a period of time elapses, the period between incremental rotations can be increased or decreased as desired based on the level of cooking oil present in fry vat 406. For example, in the situation illustrated in FIG. 13, the duration between incremental rotation of fry wheel 410 could be decreased compared to the situation depicted in FIG. 20 where the level H' of cooking oil is significantly lower than the level H of cooking oil in FIG. 13. This assumes that the temperature of cooking oil in each of the situations depicted in FIGS. 13 and 20 is substantially the same. Similarly, if a constant rotation fry wheel operation is utilized, such as where fry wheel 410 would rotate constantly, the rotational speed could be increased to handle the situation depicted in FIG. 13 compared to the speed of the wheel that would be utilized for the situation in FIG. 20, where the level H' of cooking oil in FIG. 20 is significantly less than the level H of cooking oil in FIG. 13.

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[0215] Referring to FIGS. 13 and 20, frying device 400 can also include a fry wheel follower "or fry wheel liner" 502 which is supported by a fry wheel follower support 504. Fry wheel follower 502 is a curved perforated circular segment having a width approximately equal to the width of fry wheel 410. Fry wheel follower 502 is supported by a pair of fry wheel follower supports 504 that are spaced apart and connected by lateral supports 506. Fry wheel follower 502 prevents food pieces that are larger than the perforations in fry wheel follower 502 from falling from fry wheel compartments 422-436 during operation. Preferably, the perforations in fry wheel follower 502 are composed of circular holes having a diameter of about 0.187 inches that are in staggered rows having a center-to-center hole distance of about 0.312 inches. Fry vat 406 includes a suitable heating element 505, illustrated in FIGS. 13, 20 and 21.

[0216] Referring to FIGS. 17-19 there is illustrated a curved compartment forming member 438 which is composed of two opposed sidewalls 508a and 508b that are interconnected by a curved J-shaped member 510 that forms compartment bottom 510a and compartment top 510b. Preferably, a wiper 512 is suitably mounted to compartment member 510.

[0217] A plurality of compartment forming members 438 are mounted together in fry wheel 410 to provide a plurality of adjacent peripheral food compartments 422-436 as illustrated in FIG. 13. As illustrated in FIG. 13, the top of one J-shaped member 510 abuts the bottom of adjacent J-shaped member 510. Thus, advantageously, a fastening member 514, which can be a rivet, for example, that secures wiper 512 to compartment bottom 510a of one curved J-shaped member 510 will also pass through the compartment top 510b of the adjacent curved J-shaped member 510. Preferably, wiper 512 has a plurality of transversely extending grooves 516a-f that permit drainage of cooking oil there-through as wiper 512 exits the cooking oil in fry vat 406, for example.

[0218] Referring to FIG. 17, opposed sidewalls 508a,b and curved J-shaped member 510 are perforated to permit the flow of cooking oil therethrough thereby promoting good heat transfer between the cooking oil contained in fry vat 406 and food contained in one of compartments 422-436 when immersed in cooking oil. A suitable hole size is about 0.156 inches spaced center-to-center about 0.250 inches. Wiper 512 also ensures that close contact is maintained between the interface of fry wheel follower 502 and the top and bottom ends of each food compartment 422-436 which in each case will be bounded by one of wipers 512. Any suitable material can be used for wiper 512 such as rubber or Teflon, for example.

[0219] As an alternative construction, compartments 422-436 could be constructed from curved J-shaped members 510 without opposed sidewalls 508a and 508b, in which case the compartment sidewalls could be formed from opposed circular disks 458a and 458b. In addition, it should be appreciated by one skilled in the art that any desired compartment shape can be utilized in accordance with the invention as long as the food can be loaded into the compartment, kept within the compartment during immersion in the cooking oil and which compartment shape discharges the food from the fry wheel.

[0220] Referring to FIGS. 21 and 22, there are illustrated further aspects of fry device 400. FIG. 21 is a sectional view

along line 21-21 of FIG. 20. FIG. 21 illustrates the elements previously described and in addition shows the interface of adjacent fry vats 406 and 420 and in enlarged form in FIG. 22. Disposed between fry vats 406 and 420 is a banking strip 518 that bridges the gap between fry vats 406 and 420. Banking strip 518 can be in a shape as desired and in the illustrated embodiment is a generally inverted V-shaped strip that spans the gap between fry vats 406 and 420. Banking strip 518 prevents any material that is discharged between fry wheels 410 and 412 from falling between fry vats 406 and 420 and causing such material to fall into one of fry vats 406 and 420.

[0221] Referring to FIGS. 23 and 24, there are illustrated alternate embodiments of a fry wheel for use in accordance with the invention. It is to be understood that the fry wheel is capable of numerous changes and rearrangements, and the fry wheel, as well as other components and embodiments of the present invention, is not intended to be limited to the specific embodiments described herein.

[0222] Referring to FIGS. 23 and 24, there are illustrated wire form wheels 479 and 481. Each of wheels 479 and 481 has a rim 520 and 522, respectively, constructed of tubing, which can be smooth tubing. Such a wheel could be driven by a friction wheel, if desired. In each of wheels 479 and 481 a plurality of individual tubular spokes 524 extend from each rim to a corresponding hub assembly 526. An axle 528 connects hubs 526 together in each of wheels 479 and 481. Wheel 479 includes a slotted member 530 that bridges each pair of spokes 524. Each slotted member 530 includes a centrally disposed slot 532 and a pair of tabs 534 on either side of slot 532. A plurality of fry baskets 536, one for each slotted member 530 or pair of spokes 524 is mounted in a snap-lock relationship to each slotted member 530. Fry baskets 536 have perforated sides and a perforated bottom and top and can be of a similar configuration as previously described with respect to fry wheel 410. Each basket 536 can have a spring tab member 538 that interlocks with slotted member 530 to secure fry basket 536 to fry wheel 479 resulting in a finished fry wheel 481 as shown in FIG. 24. It is to be understood that the embodiment illustrated in FIGS. 23 and 24 is not limited to snap-in baskets and that other baskets can be used with the wheel arrangement depicted in FIG. 23 with or without slotted members 530. For example, baskets could be welded or otherwise affixed to rim 520 and spokes 524. Each of fry baskets 536 includes perforations 540 on the sides, top and bottom thereof, such as previously described with respect to compartment forming member 438.

[0223] Referring to FIG. 24, there is illustrated an alternative drive mechanism 535 to rotate fry wheel 481. Drive mechanism 535 includes a motor 537, a shaft 539 and drive rollers 541 and structure for supplying a force in the direction of arrow FW. Drive rollers 541 are mounted on shaft 539 which can be rotated by motor 537 to cause rollers 541, each aligned with one of rims 522, to rotate, thereby rotating fry wheel 481. A force FW is supplied in the direction of arrow FW to ensure that rollers 541 impart a sufficient tractive force to cause rotation of fry wheel 481. Force FW can be supplied by any suitable structure, including a spring, a weight or an electromagnet, for example. For example, motor 537, shaft 539 and rollers 541 could be mounted on a platform (not shown) that is moveable in the direction of arrow FW and a force could be applied to urge platform in

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the direction of arrow FW to ensure proper traction of rollers 541. Rollers 541 may be constructed of any suitable material, including rubber, for example. Motor 537 can be controlled by fry control 116, for example.

[0224] Fry wheel 410 can be rotated as desired so that food deposited in one of compartments 422-436 travels through and out of the cooking oil 454 until that compartment reaches a discharge location. Thus, in the embodiment illustrated in FIGS. 13 and 20, the rotation is in a clockwise direction as indicated by arrow K in FIG. 13 and arrow K in FIG. 20. The rotation of fry wheel 410 can be either continuous or periodic. In a periodic rotation, the rotation will typically be incremental, that is, the wheel is rotated to some degree and then stops. Thereafter, after a set period of time, the wheel undergoes another periodic rotation. This process continues as each fry basket is rotated through and out of the cooking oil vat and to the discharge location. Preferably, each periodic rotation consists of a rotation of 360° divided by the number of compartments present in the fry wheel or some fraction of that periodic rotation increment so that the position of the wheel can be known without the use of sensors. However, the use of a sensor or sensors to be able to monitor wheel position can also be used either as the primary way of controlling wheel position or as a backup. Also, use of a sensor to determine wheel position allows use of a standard AC or DC motor. Suitable control of wheel 410 can be accomplished by fry control 116, for example.

[0225] In accordance with the present invention, a basket shaking simulation can be achieved. Basket shaking simulation can be performed by a relatively slight back and forth rotation of the fry wheel, such as fry wheel 410. Thus, the drive mechanism is activated to rotate the fry wheel clockwise and counterclockwise through a relatively small degree of angular rotation to simulate shaking of a fry basket during frying. The back and forth rotation can occur relatively rapidly and typically the degree of angular rotation will be in the range of from about 2 to about 20 degrees. In addition, the periodic rotation in one direction may be of a larger angle of rotation than the rotation in the other direction.

[0226] Preferably, the degree of rotation during simulated basket shaking will be monitored, particularly where the rotation in one direction is greater than the rotation in the other direction so that the position of each basket relative to the discharge location can be monitored by the control system to ensure proper discharge of food from food compartments.

[0227] Referring to FIG. 64, there is illustrated in partially schematic view fry device 400 along with portions of food dispensing device 200 and food packaging device 600. As illustrated in FIG. 64 a hood system 546 is provided. Hood system 538 includes a hood structure 548, a filter 542 and a drip pan 544.

[0228] A suitable air blower (not shown) can be provided to cause air flow to move within hood system 538 generally in the direction of arrows A1, A2 and A3. Filter 542 thus filters particulate matter in air flow A1 that passes through filter 542. Drip pan 544 catches any matter that drips from filter 542 that is located above drip pan 544. Preferably, hood system 538 substantially completely encloses the area above fry device 400 to reduce waste discharge into the operating environment of automated food processing system 100.

[0229] Food Packaging Device

[0230] Referring to the Figures generally, and in particular to FIGS. 1 and 25-50, there is illustrated various embodiments of food packaging devices and elements thereof in accordance with the invention.

[0231] In one embodiment, food packaging device 600 is illustrated or partially illustrated and elements useful in connection with food packaging device 600 are illustrated in FIGS. 1 and 25-50. Food packaging device 600 includes a cabinet 602 having a countertop surface 636. Food packaging device 600 can be advantageously constructed in modular form so that it can be operated together with previously described food dispensing device 200 and fry device 400 and alternatively operated separately from both or either of those devices.

[0232] Food packaging device 600 in the illustrated embodiment includes a food inlet chute 604, rotatable food dispensing member 606, food dispensing chute mechanism 608, automated container handling system 610, container-receiving receptacle 612, overflow food collection member 613, conveyor system 614, waste chute 615, food seasoning system 616 and raceway 620.

[0233] In the illustrated embodiment, food packaging device 600 includes a container storage device for containing cartons or containers of various sizes. During operation of packaging device 600, the device selects a container of a desired size from container storage magazine 638, erects the container into an erected form that is unerected while contained in storage magazine 638 and then positions the erected container to receive food dispensed from food dispensing chute mechanism 608. After receiving food from food dispensing chute mechanism 608, automated container handling device 610 is capable of moving the filled or partially filled container to container receiving receptacle 612 which is transported via conveyor system 614 to a desired location for subsequent pickup of the container by a human operator, for example.

[0234] In the embodiment illustrated in FIGS. 25-29, food packaging device 600 includes food overflow collection member 613 to collect food dispensed by food dispensing chute mechanism 608 that is not deposited into a container. In the illustrated embodiment, overflow food collection device 613 is a rotatable wheel as hereinafter described in detail. Overflow food collection member 613 functions to collect food dispensed by food dispensing chute mechanism 608 that is not received in a container and to recycle that food into food dispensing chute mechanism 608 for subsequent dispensing to a container. This permits food dispensed by food dispensing chute mechanism 608 but not deposited in a container to be promptly recycled to the dispensing chute in a first-in, first-out manner, so that overflow food is promptly recycled and dispensed to a container.

[0235] Referring to FIGS. 26-28, there is illustrated food packaging device 600 in which inlet chute 604 is positioned to receive food, in this case French fries, from food dispensing lanes 234, 236 and 238 of dispensing device 200, which food has been subsequently fried after dispensing in fry wheels 410, 412 and 414 of fry device 400. After frying in any of wheels 410, 412 and 414 of fry device 400, food dispensed therefrom enters inlet chute 604, as illustrated in FIGS. 3 and 28, for example. In inlet chute 604 the food

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travels downwardly along chute 604 and into rotatable food dispensing member 606 in the direction of arrow M of FIG. 28 and arrow E of FIG. 3. Inlet chute 604 can be configured as desired and may be configured to accept the product from any one or all of fry wheels 404, 410, 412 and 414. In FIGS. 25-27, a holding area 607 receives product from fry wheel 404 for manual packaging. A manual or automated diverter bar 605 can optionally be provided as shown in FIG. 27 to divert French fries from device 600 to permit filling unsalted fry orders. Bar 605 can be moved between open and closed positions as indicated by arrow Z, such as by a cylinder (not shown).

[0236] Rotatable food dispensing member 606 in the illustrated embodiment is a dispensing wheel that is mounted for rotation in dispensing device 600. Dispensing member 606 has a plurality of food containing compartments 640 that are arrayed around the periphery of rotatable food dispensing member 606. Each of compartments 640 is divided from another compartment by a compartment wall 642. Preferably, each compartment wall 642 is not normal to peripheral edge 644 of rotatable food dispensing member 606 but at a slight angle such as, for example, as illustrated in FIG. 29 and FIG. 61.

[0237] Wheel 606 includes a pair of opposed rim portions 646a and 646b and a circular ring portion 648 that interconnects opposed rims 646a and 646b. Circular ring 648 is disposed close to the peripheral edges of rims 646a and 646b and defines peripheral edge 644. Preferably, circular ring 648 is constructed of a perforated metal material so that circular rims 646a and 646b have perforations 650 therethrough as illustrated in FIG. 28, for example.

[0238] In accordance with the illustrated embodiment, rotatable dispensing member 606 is configured as a rotatable wheel although other embodiments are within the scope of the invention. For example, a rotatable dispensing member in accordance with the invention could be a portion of a wheel, such as a semicircular or other configuration.

[0239] In the illustrated embodiment, rotatable food dispensing member 606 is rotated by a drive mechanism 652. Drive mechanism 652 consists of a motor 654 that drives a drive wheel 656. Drive mechanism 652 is controlled by a suitable control mechanism to cause rotation of drive wheel 656 and hence rotatable food dispensing member 606 in a desired direction and at a desired rate of speed. Drive wheel 656 can be a pressure roller or alternatively can be a drive wheel like or similar to drive wheel 468 previously described with respect to FIG. 14. Rotatable food dispensing member 606 can be driven via one or both of opposed rims 646a and 646b. Alternatively, and as illustrated in FIG. 28, rotatable food dispensing member 606 is driven through a drive rim 658. Each of rotatable food dispensing members 606 and overflow food collection member 613 rest on spaced apart rollers 660 and 662. Each of rollers 660 and 662 are constructed to bear the weight of rotatable food dispensing member 606 and overflow food collection member 613 and have a length that spans both. Alternatively, separate rollers or some other supporting structure could be used to support rotatable food dispensing member 606 and overflow food collection member 613. An inner curved fender or baffle member 664 as illustrated in FIG. 29 is provided to ensure that food contained in compartment 640 of rotatable food dispensing member 606 does not prematurely dis-

charge. Preferably, fender 664 follows the inner curvature of rotatable food dispensing member 606 and has perforations 666, which can be similar to perforations 650 of circular ring 648. Fender 664 is suitably mounted so that it is stationary relative to rotatable food dispensing member 606. A similar fender could also be provided for overflow food collection member 613, if desired (not shown).

[0240] Referring to FIG. 61, there is illustrated an elevation view of a portion of rotatable food dispensing member 606 which is typically rotated in the direction of arrow Y when viewed from the front of food packaging device 600. Fender 664 prevents food, in this case French fries FF, from falling from compartments 640 prematurely.

[0241] Overflow food collection member 613 is configured to collect food deposited from food dispensing chute mechanism 608 that is intended to be received into container 611 when held in position to receive food from food dispensing chute mechanism 608 which food does not stay in container 611. This can occur since oftentimes it is desirable to overfill container 611 so that food is mounded up above the top surface of container 611. Also, for food such as French fries, such food material fills container 611 somewhat randomly and it is typical for French fries to dangle over the sides of container 611. In the illustrated embodiment, overflow food collection member 613 is configured in a manner similar to rotatable food dispensing member 606 previously described. Thus, food collection member 613 includes opposed rims 668a and 668b and circular ring 670 having perforations 672. Circular ring 670 connects opposed rims 668a and 668b in a manner as previously described with respect to member 606. In addition, food collection member 613 has a plurality of inner compartments that are similar in construction to compartment 640 previously described with respect to member 606. Member 613 also has a drive rim 674 and is driven by a drive mechanism 676 that is similar to drive mechanism 652 previously described including a drive wheel 676' and a motor 678. Drive mechanism 676 is configured to rotate food collection member 613 in either a clockwise or counterclockwise direction as hereinafter described in more detail.

[0242] Food collection member 613 also includes a plurality of compartment walls 680 that are similar to compartment walls 642 previously described with respect to rotatable food dispensing member 606, providing a plurality of food containing compartments 682.

[0243] Each of food dispensing member 606 and food collection member 613 has bottom portions that are disposed through an opening 684 in countertop surface 636 of cabinet 602. The construction of the illustrated embodiment permits food dispensing member 606 and overflow food collection member 613 to be readily removed from food packaging device 600 such as for cleaning and/or repair.

[0244] A heating system as described can be incorporated into food packaging device 600 to supply heat to food contained therein. For example, a heating system 681 can be provided, which is illustrated in FIG. 29. Heating system 681 includes a heating device 683 having a heating element 685, located above dispenser 606 as desired. Heating devices 687 and 689 may also be included within dispenser 606 and/or 613 as desired. The heating devices may comprise radiant heaters and can be ceramic heaters, for example. Any suitable type of heating device or system can

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be used in accordance with the invention Heating system 681 can be controlled by packaging control 118, for example. In addition, a heating device can be provided to direct heat to food container pick up location 622, if desired to keep food contained thereat warm

[0245] Referring to FIGS. 1, 3, 25-26, 28-29 and 43-44, various aspects of the configuration and operation of food dispensing chute mechanism 608 are illustrated and will be described. Food dispensing chute mechanism 608 includes an upper chute 686, a lower chute 688, a chute support member 690, a connecting link 692, a stop member 694, a rotatable link 696 connecting stop member 694 to chute support member 690, a rotatable link 698 connecting upper chute 686 to support member 690, a cylinder 700 for operating food dispensing chute mechanism 608, a load cell 702 for weighing the contents of food contained in food dispensing chute mechanism 608 and a rotatable link 704 connecting cylinder rod 706 to upper chute 686.

[0246] Upper chute 686 preferably and as illustrated in the referenced figures, forms part of food dispensing chute mechanism 608, and has an inlet location 708 for receiving food dispensed from rotatable food dispensing member 606 and a discharge location 710 for dispensing food contained in food dispensing chute mechanism 608 and into a container, such as container 611 as illustrated in FIG. 43, for example.

[0247] Upper chute 686 of food dispensing chute mechanism 608 is positioned to receive pieces of food from a discharge location 712 of rotatable food dispensing member 606. Upper chute 686 has a food holding area 714 for holding food received from rotatable food dispensing member 606. A weighing device is associated with food dispensing chute mechanism 608 so that the amount of food contained therein, such as in food holding area 714, can be determined. Any suitable device can be utilized to determine the amount of food contained in food dispensing chute mechanism 608. In the illustrated embodiment, a load cell 702 is provided to determine the weight of food contained in food dispensing chute mechanism 608 and is illustrated schematically in FIGS. 43 and 44, for example.

[0248] FIG. 44 illustrates food dispensing chute mechanism 608 in the upper position ready to receive food from rotatable food dispensing member 606. In that configuration, cylinder 700 is retracted and upper chute 686 is generally horizontal. This configuration allows a quantity of food to be dispensed into upper chute 686 and into food holding area 714 without being dispensed therefrom. When a sufficient quantity of food is deposited in upper chute 686, such as French fries FF, as determined by load cell 702 which communicates with the control system of food packaging device 600, the food contained therein is ready to be dispensed. Typically, the amount of food contained in chute 686 will be sufficient to adequately fill container 611. Since container 611 is of a known size, rotatable food dispensing member 606 can be operated to supply food to chute 686 until a desired quantity is contained therein for dispensing to container 611.

[0249] To dispense food from food dispensing chute mechanism 608, cylinder 700 is activated to extend cylinder rod 706 upwardly thereby causing upper chute 686 to drop. Since lower chute 688 is connected to upper chute 686 via connecting link 692, lower chute 688 also drops to the

discharge position as illustrated in FIG. 43 which movement is indicated by arrow S. Stop 694 which is connected to lower chute 688 and pivotally mounted via rotatable link 696 to chute support member 690, engages chute support member 690 as illustrated in FIG. 43 and prevents further downward movement of upper chute 686 and lower chute 688. In addition, stop member 694 engaging chute support member 690 defines the lowermost position of upper chute 686 and lower chute 688 which is also the dispensing position of food dispensing chute mechanism 608, as illustrated in FIG. 43. This position also provides discharge location 710 of dispensing chute mechanism 608.

[0250] Referring to FIGS. 25-28, there is illustrated container storage magazine 638, which can form part of food packaging device 600. Container storage magazine 638 is configured to store a plurality of different sized food containers in an unerected form. Typically, container storage magazine 638 will be configured to hold a variety of different sized containers. In the illustrated embodiment, container storage magazine 638 can contain four different sizes of French fry containers or cartons. Container storage magazine 638 includes a base 716 that is suitably mounted with mounting structure 718 to cabinet 602. Preferably, mounting structure 718 permits container storage magazine 638 to be readily removed to permit access to rotatable food dispensing member 606 and overflow food collection member 613.

[0251] Base 716 typically can be in the form of a base plate and includes four apertures 720, 722, 724 and 726, each of said apertures corresponding to the profile of a different size collapsed carton. Apertures 720, 722, 724 and 726 are dimensioned to be able to retain a stack of cartons in a collapsed or unerected condition as illustrated in FIG. 25 in which a plurality of unerected cartons 728 are stacked therein.

[0252] Each aperture 720, 722, 724 and 726 and base 716 has associated therewith a plurality of guide members 730-760. In the illustrated embodiment, guides 730-760 are in the form of post or tubular-type members. Each set of four guide members is associated with a specific one of apertures 720, 722, 724 and 726 to define and permit stacking of a plurality of unerected French fry cartons or containers that generally correspond in size to the size of apertures 720, 722, 724 and 726, respectively. It is to be understood that other arrangements to define a container stack can be utilized in accordance with the invention. For example, in place of guides 730-760 other structure could be utilized, such as upstanding walls or partial walls or other types of guides.

[0253] Container storage magazine 638 may also include a suitable removable cover (not shown) to enclose base 716 and the volume defined over apertures 720-726 by guides 730-760.

[0254] Container storage magazine 638 is preferably positioned to permit ready access to the bottom of each container stack through the bottom of each of apertures 720-726 by automated container handling system 610, which is herein-after described in detail.

[0255] Food packaging device 600 includes automated container handling system 610. Automated container handling system 610 is capable of retrieving an unerected

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container through any of apertures 720, 722, 724 and 726 of unerected container storage magazine 638, erecting the unerected carton, holding the erected carton in position at discharge location 710 of food dispensing chute mechanism 608 and depositing the filled container onto conveyor system 614, which conveyor system 614 subsequently transports the filled container to a desired location

[0256] Referring to FIGS. 1, 25, 27-28 and 30-44, there is illustrated automated container handling system 610 and elements and features thereof. Automated container handling system 610 includes a container retrieving and grasping device 762, a container grasping device 764 and a container bottom urging device 766.

[0257] Automated container handling system 610 is controlled by a suitable control system for food packaging device 600.

[0258] Container retrieving and grasping device 762 and portions thereof are best illustrated in FIGS. 30-39. Container retrieving and grasping device 762 includes a mast 768, which is mounted to a carriage system 770, a moveable rack member 772, a pinion 774, a frame 776, a container grasping member 778 and a linkage assembly 780.

[0259] Mast 768 is carried by carriage system 770 which carriage system 770 allows for lateral translation of mast 768 and the components associated therewith, including moveable rack member 772, pinion 774, frame 776, container grasping member 778 and linkage assembly 780. Carriage system 770 includes a guide member 782, a worm gear 784, a drive mechanism 786 and a carriage follower 788. Carriage follower 788 supports a vertical translation mechanism 790 that, in turn, carries mast 768.

[0260] Carriage guide 782 is an elongated guide that defines the lateral translation movement direction of carriage follower 788 and is secured within cabinet 602. Worm gear 784 is disposed parallel to carriage guide 782 and when rotated moves carriage follower 788 along carriage guide 782.

[0261] Worm gear 784 is driven by drive mechanism 786 which can include a drive motor 792, a drive gear or pulley 794 and a driven gear or pulley 796. Where drive and driven pulleys are used, typically a belt 798 will impart rotation from one pulley to another.

[0262] Drive motor 792 causes worm gear 784 which is mounted for rotation and which is rotated by rotation of driven pulley or gear 796 in either direction. Drive motor 792 can be an AC or DC motor or a stepper or servo motor as desired. Suitable sensors can be employed (not shown) to determine the position of carriage follower 788 which determines the lateral position of container grasping member 778.

[0263] Carriage follower 788 is composed of a frame 800 having a guide aperture or slot 802 in which carriage guide 782 is disposed and a threaded aperture or slot 804 in which elongated worm gear 784 is disposed to impart lateral motion to carriage follower 788 by rotation of worm gear 784. Thus, carriage system 770 provides lateral movement in the direction of arrows Q as shown in FIG. 39. In this manner, carriage follower and thus mast 768 can be laterally translated as it desired.

[0264] A suitable opening 806 is located in countertop surface 636 of cabinet 602 to permit mast 768 to extend therethrough.

[0265] Mast 768 can be raised and lowered in a vertical direction as indicated by arrow V in FIG. 39.

[0266] Mast 768 can be vertically raised and lowered in the directions indicated by arrow V in FIG. 39 by operation of a drive mechanism 810 that forms part of vertical translation mechanism 790. Vertical translation mechanism 790 is a vertically extending carriage system similar to that described with respect to carriage system 770 and includes a drive mechanism 810 which is composed of a motor 812 which is carried by carriage follower 788, a vertically disposed carriage guide 814, a vertically disposed worm gear 816 which is driven in a suitable manner by motor 812 such as previously described with respect to drive mechanism 786 of carriage system 770, which can be controlled in a similar manner. Vertical translation mechanism 790 also includes a vertical carriage follower 818 having a threaded aperture or slot and a guide aperture or slot (not shown) which vertical carriage follower 818 is secured to mast 768.

[0267] Mast 768 has mounted thereto frame 776, typically at an upper end thereof. Linkage assembly 780 is secured to frame 776 as well as pinion 774 and moveable rack member 772.

[0268] Moveable rack member 772 includes a frame 820 having a guide slot 822 vertically disposed therein and a rack 824 which meshes with pinion 774. Moveable rack member 772 may also include extra mass in the form of a weight block 826 to help urge moveable rack member downwardly when not restrained.

[0269] A pair of guides 828 and 830 are rigidly secured to frame 776 and are disposed within slot 822 of moveable rack 772. A spring 832 can be connected between an upper end of moveable rack member 772 and guide 828 or 830 to urge moveable rack member 772 to a lower position as illustrated in FIG. 30 compared with the upper position as illustrated in FIGS. 34-37.

[0270] In a preferred embodiment, moveable rack member 772 includes a stop 834 which stop can be vertically adjustable. While stop 834 is located at the bottom of moveable rack member 772 it is to be understood that a stop could be provided at another location provided that a suitable engaging surface at a proper location is provided.

[0271] Mounted to frame 776 is an axle 836 that is mounted for rotation relative to frame 776. Axle 836 has pinion gear 774 rigidly secured thereto as well as one end 838 of linkage 780. The other end 840 of linkage 780 is securely mounted to frame 776 as illustrated in FIGS. 30-37, for example.

[0272] Linkage 780 which carries container grasping member 778 is composed of a plurality of links so that container grasping member 778 is moveable from a horizontal position as illustrated in FIGS. 30-32 to a vertical position as illustrated in FIGS. 34-37. When container grasping member 778 is in the horizontal position it is utilized to grasp and retrieve a desired size of container from one of the apertures 720, 722, 724 and 726 from container storage magazine 638. For this purpose, container grasping member 778 includes a suction cup device 840 which

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includes at least one suction cup 842 and in the illustrated embodiment two suction cups 842 and 844 arrayed in substantially the same plane for grasping a container having a surface to be grasped by both suction cups 842 and 844 in the same plane. Suction cup device 840 also includes a vacuum source 846, a release valve 848 and a suitable vacuum line 850 which connects suction cups 842 and 844 to vacuum source 846, as illustrated in FIG. 30, for example. In operation, when suction cups 842 and/or 844 engage a container or other member to be grasped, vacuum source 846 is activated to supply vacuum to suction cups 842 and 844, such as to grasp and retain a container from one of apertures 720, 722, 724 and 726 of container storage magazine 638.

[0273] Linkage assembly 780 includes, in the illustrated embodiment, a first link 852, a second link 854 and third link 856.

[0274] First link 852 is rigidly secure to axle 836 and pinion 774. First link 852 is configured in an L-shape with the end of first link 852 opposite the portion connected to axle 836 pivotally connected to second link 854 having one end being pivotally connected to first link 852 via pivot connection 858.

[0275] Second link 854 is connected to third link 856 via a universal joint connection 860 a location spaced apart from pivot connection 858 as illustrated in, for example, FIGS. 30-37. Suction cups 842 and 844 are mounted to second link 854. An offset member 862 which depends from second link 854 provides a desired offset for universal joint connection 860 which connects second link 854 to third link 856.

[0276] Third link 856 is, in turn, connected to frame 776 via a universal joint connection 864 which is at a distance removed from universal joint connection 860 which connects third link 856 to second link 854. An offset member assembly 866 is rigidly secured to frame 776 and includes an angled block 868 and an offset extension 870 to provide the desired angled and clearance for universal joint 864 and third link 856.

[0277] In operation, when moveable rack member 772 is moved relative to mast 768, such as when stop 834 contacts a surface, such as in the illustrated embodiment, countertop surface 636 as illustrated in FIG. 36, continued downward vertical movement of mast 768 causes rack member 772 to move upwardly relative to mast 768. This causes rotation of pinion 774 which meshes with rack 824 mounted to rack member 772. Rotation of pinion 774 in a counter-clockwise direction in FIG. 30 causes rotation of first link 852. Such rotation causes downward movement of that portion of first link 852 that is pivotally connected to second link 854 via pivot connection 858. Such movement, in turn, causes second link 854 to pivot upwardly about pivot connection 858 in a clockwise direction as viewed in FIG. 30 to cause suction cups 842 and 844 to move to a vertically oriented position as depicted in FIGS. 34-37 from the horizontally oriented position depicted in FIGS. 30-33. In addition, such movement of first link 852 causes movement in rotation of third link 856 and universal joint connection 860 and 864 to the position indicated in FIGS. 34-37. When container grasping member 778 is in the position indicated in FIGS. 34-37, an unerected container held by suction cups 842 and/or 844 will be vertically oriented when suction cups 842 and/or 844 are attached to the container sidewall, as illustrated in FIG. 40, for example.

[0278] In a typical operation, container retrieving and grasping device 762 will be operated to position suction cups 842 and 844 below a container to be selected from container storage magazine 638. Mast 768 will be raised by operation of vertical translation mechanism 790 to a desired height so that suction cups 842 and 844 engage a container contained at the bottom of container storage magazine 638. Vacuum source 846 is activated and mast 768 can be lowered to remove a container from a desired one of apertures 720, 722, 724 and 726 of container storage magazine 638. Carriage system 770 can be activated to move container retrieving and grasping device 762 laterally to a desired location. Such lateral movement can be controlled by properly positioned sensors 872, 874, 876, 878 and 880, for example. For example, sensor 872 can define the position to retrieve a container from aperture 720, sensor 876 to retrieve a container from aperture 722, sensor 878 to retrieve a container from aperture 724 and sensor 880 to retrieve a container from aperture 726. Sensor 874 can be positioned to define the proper location of container grasping member 778 to erect the container that has been retrieved from one of apertures 720, 722, 724 or 726 of container storage magazine 638, as hereafter described. After erecting the container, the vacuum applied to suction cups 842 and 844 is released by operation of release valve 848 which permits suction cups 842 and 844 to disengage and release the container that had been grasped. Mast 768 can then be raised causing stop 834 to be removed from countertop surface 636 and by action of weight 826 and operationally spring 832, causing rack member 772 to move downwardly relative to mast 768 thereby rotating pinion gear 774 clockwise relative to the position shown in FIG. 34, thereby moving linkage assembly 780 to cause movement of container grasping member 778 from the position illustrated in FIGS. 34-37 to the position indicated in FIGS. 30-33, where container grasping member 778 is in position to retrieve a desired carton from container storage magazine 638 in a manner previously described, which includes lateral translation of container grasping member 778 by carriage system 770.

[0279] It is to be understood that any suitable automated device or system for retrieving, grasping and moving a container to a desired location as desired herein can be utilized in accordance with various aspects of the present invention. Thus, various aspects of the present invention are not limited by the particular embodiment of container retrieving and grasping device 762 and components thereof described herein. For example, an automated or robotic arm could be utilized to select, grasp and retrieve erected or unerected containers from a source as desired and then erect the carton or container in a suitable manner, followed by holding the erected container at dispensing location 710 and after filling placing the filled container, such as container 611 on to a suitable conveyor to move the filled container to a desired location.

[0280] Container grasping device 764 of container retrieving and grasping device 762 will now be described, and in particular with reference to FIGS. 38 and 40-44.

[0281] Container grasping device 764 includes a rotatable and vertically translatable mast 884. Mast 884 can be rotated as illustrated by arrow P in FIG. 38 and vertically translated up and down as indicated by arrow O also in FIG. 38. Mast 884 is connected to a shaft 886 via a slot and key arrangement between mast 884 and shaft 886 permitting mast 884

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to be rotated by shaft 886 which, in turn, can be rotated by a step or motor 890 or other suitable motor or device to rotate shaft 886 a desired degree. Motor 890 drives a drive pulley or gear 892 which, in turn, drives a driven pulley or gear 894. In the case where pulleys are utilized, a belt 896 is used to transmit rotation from pulley 892 to pulley 894. Motor 890 can be a stepper motor or a servo motor as desired. Alternatively, an AC or DC motor can be utilized provided that a suitable control is provided so that the orientation of mast 884 can be determined. A carriage system 898 is utilized to provide the desired vertical movement of mast 884 in up and down directions. Carriage system 898 is similar to carriage system 770 previously described and includes a carriage guide 900, a worm gear 902, a carriage follower 904, a drive mechanism 906 which includes a motor 908 (which can be a servo motor or an AC or DC motor) suitably controlled to drive or gear 902. Carriage follower 904 includes a threaded aperture or slot 910 which communicates with worm gear 902 and a threaded aperture or slot 912 in which guide 900 is disposed. A carriage follower interface 914 connects carriage follower 904 to mast 884 and permits shaft 886 to rotate with respect to carriage follower interface 914. Thus, in operation, rotation of motor 908 rotates worm gear 902 thereby translating carriage follower 904 up or down depending on the direction of rotation. A suitable sensor (not shown) can be employed to determine the height of mast 884 for control by control system 118 for packaging device 600.

[0282] Suitable mounting structure 916 is provided to mount container grasping device 764 to a desired location, such as within cabinet 602. A slot and key arrangement between shaft 886 and mast 884 permits 884 mast to be vertically translated either up or down while shaft 886 is rotated.

[0283] Mounted on the upper end of mast 884 is a suction device 918 which includes a suction cup 920, a source of vacuum (not shown) for suction cup 920 and a release valve (not shown) for releasing the vacuum to suction cup 920. Vacuum can be supplied from within mast 884 to suction cup 920 by a suitable connection as is known in the art.

[0284] Container bottom urging device 766 consists of a mast 922 that is vertically translatable up and down by suitable apparatus (not shown). Such apparatus can be similar to vertical translation mechanism 790 previously described with respect to container retrieving and grasping device 762. Preferably, mast 922 has a blunt end 924.

[0285] In operation, container retrieving and grasping device 762 selects an appropriately sized container from container storage magazine 638 as directed by the control system for food packaging device 600. After retrieving the container, which in this case is container 611, container retrieving and grasping device 762 moves container 611 to a position as indicated in FIG. 40 against suction cup 920 so that opposed sidewalls of container 611 are grasped by suction cups 840 and 842 of container grasping member 778.

[0286] Next, as shown in FIG. 41, container grasping member 778 is moved laterally away from suction cup 920 while maintaining suction on suction cups 840, 842 and 920. Container 611 is partially erected as shown in FIG. 41 with bottom 611 b depending downwardly slightly. Container bottom urging device 766 is then activated as illustrated in FIG. 42 to urge bottom 611 b of container 611 upwardly into

the fully erected position. Container grasping member 778 is released and retracted from container 611 and returned to a horizontal up position to select another unerected container for erection.

[0287] Next, mast 884 is rotated approximately 90° by motor 890 to place container 611 in discharge position 710 of food dispensing chute mechanism 608. Food dispensing chute mechanism 608 is then lowered to discharge French fries FF therefrom and into container 611. Any French fries that are not received into container 611 are collected by overflow food collection member 613 which is then rotated clockwise in the direction of arrow X as shown in FIG. 41 to recycle such French fries to upper chute 686 for subsequent delivery to another container. After the French fries are dispensed from food dispensing chute mechanism 608, cylinder 700 is retracted placing food dispensing chute mechanism 608 in the upper position as shown in FIG. 44. Mast 884 can then be rotated back and forth slightly (e.g., such as 2° to 20°, for example) to simulate shaking to dislodge any loose French fries or dangling French fries in container 611 and any dislodged French fries will then fall into overflow food collection member 613 for subsequent recycling. Mast 884 can also be raised and lowered slightly and relatively quickly either before, during or after the angular rotation to further simulate shaking. Thereafter, mast 884 is rotated approximately 180° until container 611 is directly over container-receiving receptacle 612 as indicated by T in FIG. 44. Mast 884 is then lowered by operation of carriage system 898 until the bottom of container 611 rests in container-receiving receptacle 612. Then, the vacuum supplied to suction cup 920 is released and suction cup 920 releases from container 611. Mast 884 can then be rotated 90° so that it is in position to receive another container to be erected.

[0288] Container-receiving receptacle 612 is then transported via conveyor system 614 which will now be described in detail.

[0289] Conveyor system 614 and portions or elements thereof are illustrated in various figures including FIGS. 1, 25-29 and 45-50.

[0290] Conveyor 614 includes, in the illustrated embodiment, raceway 620 which can be formed along the surface of countertop 636 or on some other surface as desired. Raceway 620 is preferably in the form of a continuous loop raceway and is defined by spaced apart guides 620a and 620b mounted to countertop 636 to guide receptacles 612. Conveyor system 614 includes one or more and typically a plurality of container-receiving receptacles 612 which are illustrated in detail in FIGS. 46-50. Gate structure 634 of conveyor system 614 includes a first gate 926 and second gate 928. First gate 926 is moveable and typically second gate 928 can be stationary as hereinafter described.

[0291] Conveyor system 614 also includes structure for causing movement of container-receiving receptacle 612. In the illustrated embodiment, container-receiving receptacles 612 are moved via an endless loop 930 that can be located beneath countertop 636. Endless loop 930 carries a plurality of magnets 932 as illustrated in FIGS. 45 and 49, for example. Magnets 932 are spaced along endless loop 930. Endless loop 930 may comprise a chain or other suitable structure that can be driven by a drive system that includes sprockets 934, 936, 938 and 940. One of sprockets 934, 936, 938 and 940 can be a driven sprocket.

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[0292] Any suitable endless loop 930 can be utilized such as a belt or a chain. Pulleys could be used in place of sprockets 934-940. The route of endless loop 930 follows the route of raceway 620.

[0293] Container-receiving receptacle 612 typically includes a base 942 and a container-receiving well 944 located over base 942. Base 942 includes an enclosed compartment 946 which can be conveniently accessed by a base plate 948 located along the bottom of base 942 that is fastened to base 942 by suitable fasteners 950. Contained within enclosed compartment 946 is a magnet 952.

[0294] Container-receiving receptacle 612 follows the movement of magnet 932 due to magnetic attraction between magnets 932 and 952 thereby causing movement of container-receiving receptacle 612 along raceway 620.

[0295] Enclosed compartment 946 is dimensioned to permit magnet 952 to be free to rotate therein allowing container-receiving receptacle 612 to be readily guided by rails 954 and 956 that are raised above countertop 636.

[0296] Movable gate 926 prevents movement of container-receiving receptacle 612 located thereat as illustrated in FIG. 45. This ensures that container-receiving receptacle 612 is in position to receive a loaded container of French fries, such as container 611 from container grasping device 764. After a filled container is placed on container-receiving receptacle 612 adjacent moveable gate 926, gate 926 is automatically removed by a suitable mechanism (not shown) to permit container-receiving receptacle 612 thereat to be moved by conveyor system 614 until French fry container 611 contained therein contacts gate 928 or receptacle 612 contacts another receptacle that is located at pick up area 622 as shown in FIG. 45. Once container 611 is moved from receptacle 612b, receptacle 612b is then free to move along raceway 620 and passes underneath second gate 928, which can be a stationary gate. Alternatively, second gate 928 could be a moveable gate and could be located at a level that directly prevents movement of receptacle 612b. After receptacle 612b passes underneath second gate 928, receptacle 612a is moved into the position formerly occupied by receptacle 612b provided that receptacle 612a has a French fry container thereon which would then cause receptacle 612a to be stopped at gate 928. Similarly, when that container is removed from receptacle 612a, receptacle 612a would then be free to pass underneath gate 928 and around that portion of raceway 620 until encountering gate 926 or another receptacle that is stopped by gate 926.

[0297] Referring to FIGS. 51-60, there is illustrated various views of French fry cartons that are useful in accordance with the present invention. The French fry cartons depicted in FIGS. 51-60 are particularly suitable for use in conjunction with the present invention since the cartons readily stand upright without assistance and can be erected by automated container handling system 610, previously described.

[0298] FIG. 51 illustrates a front elevation view of a carton 1012 that is particularly suitable for containing French fries, for example. Carton 1012 is illustrated in FIG. 51 in an erected or opened position and includes a pair of opposed curved sidewalls 1014 and 1016 and a bottom panel 1018.

[0299] Carton 1012 can be stacked in a collapsed configuration and stored in a suitable magazine, such as container

storage magazine 638 as previously described. When in a collapsed position, carton 1012 is particularly suited to being opened or erected by pulling sidewalls 1014 and 1016 apart and urging bottom panel 1018 upwardly, as described with respect to the erection or opening of container 611 by automated container handling system 610. Container or carton 611 is of a design that is similar to carton 1012.

[0300] Carton 1012 also includes two supporting legs 1020, 1022 that extend downwardly from the lower portions of the overlapping edge portions of sidewall 1014 indicated by reference numerals 1014a and 1014b in FIG. 59 and FIG. 53.

[0301] Carton 1012 is capable of standing on its own because of legs 1020 and 1022 that extend below bottom panel 1018 when carton 1012 is open or erected.

[0302] Carton 1012 can be constructed from a single blank of paperboard which is illustrated in FIG. 59. When constructed, sidewall edge portions 1014a and 1014b form flaps that are glued to the edges of sidewall 1016 as indicated in FIG. 54, for example.

[0303] Bottom panel 1018 is specially configured to facilitate opening or erection of carton 1012 by an automated carton handling device such as automated container handling system 610, previously described in detail. Bottom panel 1018 includes intersecting lines 1024 and 1026. Intersecting lines 1024 and 1026 intersect at a generally central location of bottom panel 1018, which panel is generally oval even though it may incorporate straight edges 1028 and 1030, for example. Intersecting lines 1024 and 1026 may be fold lines, lines of weakening, score lines or even perforations. All such structures are referred to herein with respect to intersecting lines 1024 and 1026 of bottom panel 1018 only as "fold lines." Typically, the intersection of fold lines 1024 and 1026 form an angle in the range of from about 60° and about 120°. In one embodiment, the intersecting bottom panel fold lines are oriented such that one of said lines (fold line 1024 in FIG. 59) is normal or at least generally normal to curved sidewalls 1014 and 1016. In such embodiment, the other of the intersecting fold lines (in this case fold line 1026) is at least generally parallel to curved sidewalls 1014 and 1016.

[0304] Preferably, fold line 1024 extends from sidewall 1014 to sidewall 1016.

[0305] As previously mentioned, carton 1012 is foldable to a collapsed position with sidewalls 1014 and 1016 being planar and in contacting overlying relation to each other with bottom panel 1018 being divided into two overlying panels 1018a and 1018b by intersecting fold line 1026.

[0306] Preferably, bottom panel 1018 includes two additional fold lines 1032 and 1034 on either side of fold line 1024 that extends from one carton sidewall to the other, in this case from sidewall 1014 to sidewall 1016. Secondary fold lines 1032 and 1034 further facilitate the opening or erection of container 1012 with an automated device such as automated container handling system 610.

[0307] FIG. 58 illustrates a carton 1036 that is similar in construction to carton 1012 previously described except that carton 1036 is of a different size. Preferably, carton 1012 is configured such that the width of the base is relatively narrow and the sidewalls 1014 and 1016 flare outwardly so

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that container 1012 is substantially wider at the top (from about 1.6 to 2 or more times the base width) This allows relatively large and tall containers to be placed in an automobile cup holder CH as depicted in FIG. 56

[0308] Referring to FIG. 2, there is illustrated an alternate embodiment of an automated food processing system 101 in accordance with the invention. Automated food processing system 101 includes a food dispensing device 201 which is similar to food dispensing 200, previously briefly described, where like reference numerals represent like elements. Food dispensing device 201 includes fewer uncooked bulk food dispensing containers 204 and additional magazine food dispensers that are similar to magazine food dispenser 206, previously referred to. Otherwise, dispensing device 201 is similar to dispensing device 200 previously described

[0309] Automated food processing system 101 also includes fry device 400 which has been described

[0310] One primary distinction between automated food processing system 100 and automated food processing system 101 is that automated food processing system 101 does not include an automated packaging device such as automated packaging device 600. In place of food packaging device 600, a food storage device 635 is provided. Food storage device 635 allows food cooked by food frying device 400 to be stored in a heated environment for subsequent manual processing. As configured in FIG. 2, food storage device 635 includes separate product receiving receptacles 637, 639, 641 and 643. Each receptacle 637, 639, 641 and 643 is dedicated to receiving food from a respective one of fry wheels 410, 412, 414 and 404, respectively. In addition, each receptacle 637-643 can have placed therein a suitable container to receive food, such as handled trays 645, 647, 649 and 651

[0311] As illustrated in FIG. 2, a food item F is being discharged from fry wheel 414 down a chute 653 and into handled tray 649 contained within heated receptacle 641. Food item F can be stored therein for a period of time until it is ready for subsequent processing

[0312] Referring to FIGS. 62 and 63, there is illustrated heated receptacle 643 in a cross-sectional view and FIG. 63 is a cross-sectional view taken along line 63-63 of FIG. 62 showing the entire width of receptacle 643

[0313] As illustrated in FIGS. 62 and 63, heated receptacle 643 is a heated well having a heating element that heats sidewalls 962, 964, 966 and 968 as well as bottom 970 of heated receptacle 643. Heating element 960 is in close proximity to walls 962, 964, 966 and 968 as well as bottom 970. Heating element 960 may be composed of a single heating element or multiple heating elements as desired. Suitable controls may be provided to adjust the temperature of walls 962-968 as well as bottom 970 of heated receptacle 643. In addition, suitable insulation 972 can be contained within the cavity that is defined by cabinet 974 of food storage device 635, which is partially shown in FIGS. 62 and 63

[0314] Preferably, handled trays 645-651, such as handled tray 651 depicted in FIGS. 62 and 63 are dimensioned such that they are in close proximity to walls 962-968 and bottom 970 when placed in heated receptacle 643

[0315] Food packaging device 600 may optionally include food seasoning device 616, which is illustrated in detail in

FIGS. 65-68. Food seasoning device 616 includes a hopper 972, a metering wheel 974, a wheel drive system 976, a dispensing tube 978 and a dispersion head 618

[0316] Hopper 972 is configured to hold a desired bulk quantity of a seasoning material, such as salt S. Bulk hopper 972 includes a lid 982 that can be removed to replenish the supply of salt S contained therein. Hopper 972 can have a bottom with inwardly extending sidewalls 984 to facilitate the dispensing of material from bottom 986 of hopper 972 which may include a dispensing tube 988.

[0317] Metering wheel 974 is located beneath bottom 986 and dispensing tube 988 to receive a charge of salt or other seasoning therefrom. Metering wheel 974 includes a cavity 990 for receiving a charge of salt from dispensing tube 988. Metering wheel 974 is rotatably mounted in a housing 992 and can be rotated about the longitudinal axis of metering wheel 974 to cause cavity 990 to be directed downwardly which thereby causes the seasoning or salt contained in cavity 990 to fall by gravity therefrom.

[0318] Metering wheel 974 is suitably rotated by wheel drive system 976. Wheel drive system 976 can be controlled by a suitable electronic control system that can form part of the food packaging device 600. Typically, in operation, when <hi French fries FF are dispensed from one or more of fry wheels 404, 410, 412 and 414 onto chute 604, a suitable sensing device (not shown) senses the presence of French fries and activates wheel drive system 976 of automated food seasoning device 616 to discharge a predetermined quantity of seasoning, such as salt, onto the French fries that traverse chute 604.

[0319] Dispensing head 618 can be located in a desired position to apply seasoning to the food traversing chute 604. As illustrated in FIG. 3, for example, dispensing head 618 can be located towards a bottom portion of inlet chute 604 and may extend over a portion of rotatable food dispensing member 606.

[0320] Wheel drive system 976 as illustrated in FIGS. 65-68 includes a solenoid plunger 994 for driving a linkage 996 that is connected to metering wheel 974 to impart rotation to metering wheel 974. Linkage 996 includes a crank arm 998, one end of which is connected to a central portion of metering wheel 974 and the other end is connected to a lever arm 1000 which, in turn, is connected to solenoid plunger 994. Lever arm 1000 can be driven by solenoid plunger 994 which, in turn, causes crank arm 998 to be driven, thereby rotating metering wheel 974 sufficiently to cause cavity 990 to be directed downwardly, thereby permitting any seasoning or salt contained therein to be dispensed therefrom.

[0321] A collection funnel 1002 is disposed at the discharge end of housing 992 and connects to dispensing tube 978. Dispensing tube 978 is, in turn, connected to dispensing head 618.

[0322] Dispensing head 618 can include a plurality of vanes 1004 for facilitating dispersion of seasoning dispensed therefrom. As illustrated, there are four vanes 1004 spaced 90° from each other.

[0323] Dispensing tube 978 has a lower end portion 1006 that terminates some distance above dispensing cone 1008 of dispensing head 618. In one embodiment, lower end

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portion 1006 of dispensing tube 978 may terminate approximately 0.25 inches from the tip of dispersion cone 1008.

[0324] Dispersion cone 1008 includes a plurality of holes 1010 that are arrayed through dispersion cone 1008 to facilitate the distribution of seasoning or salt. In operation, as salt or seasoning is dispensed through lower end portion 1006 of dispensing tube 978, the seasoning strikes the top portion of dispersion cone 1008 and is directed into four quadrants via vanes 1004. As the seasoning traverses the surface of dispersion cone 1008, some of the seasoning falls through holes 1010 in dispersion cone 1008. Note that not all of holes 1010 are labeled, for purposes of clarity in the Figures. Other salt or seasoning particles do not fall through holes 1010 but fall off the lower end of dispersion cone 1008. Still other seasoning particles bounce or are otherwise deflected off the top surface of dispersion cone 1008 and fall a lateral distance removed from dispersion cone 1008. In this manner, a good distribution of seasoning is achieved over a relatively large area.

[0325] The Control System and Method

[0326] In one embodiment, the System Master Controller of a Server (PC), a router/hub, and a touch-screen monitor (user interface). The Master can utilize existing technology to integrate, to manage, to control, and to coordinate information flow of and through the various subsystems for overall system operation. The network technology is fully compliant with the latest version of the industry's NAFEM Protocol.

[0327] Control System Features

[0328] Referring to FIGS. 69-73, the primary functions of the Control System are to receive order information from the POS and to connect and coordinate all operating subsystem controllers with the Master Controller so that operational commands and functional information can be communicated and displayed. The result is that all the dispensing, fry and packaging modules function as one integrated fried foods production system.

[0329] In one embodiment, the Control System is event and demand driven. That is, nothing happens unless a functional component or subsystem receives a command signal to initiate the action. In a normal operation mode, the POS will provide virtually all of the system order demands. These can take the form of a string of two-bit Order Events. Typically this will be a quantity and an item (for example, 2 each regular size fries). The product description can consist of both the food item and its portion size, treated as one bit of information.

[0330] The Control System information can be categorized into Order Events, Inbound Events, and Outbound Events. The Order Events come from primarily the POS system, the historical kitchen management system (KMS) data, or the touch-screen Monitor if a manager wants to override the automatic ordering. KMS is a database of information of, for example, the sales rate of various products versus day and time. The Order Events dictate and demand the operation and performance of the automation control system for production. The Inbound Events information includes messages generated by subsystem controllers other than the POS or KMS. The Outbound Events include typical command messages issued by the Master Controller specifying functions to be performed by individual subsystem controllers.

[0331] In one embodiment, the Master Controller is configured to monitor periodically or continuously the network for events to occur. Once an event takes place and a signal is sent on the network, the Master Controller identifies the source of the signal, then compares it to the programmed schedule of events within its memory, and reacts appropriately, either sending out a new command, showing a display, storing information in memory, or all of the above.

[0332] An important source of data for the Control System can be the Kitchen Management System (KMS). The KMS is a historical database of operational information. This information can be used to set the workstation configuration, process settings, inventory levels, and set a level of production in advance of actual customer demand orders. This interface can be a two-way connection, so that all operational data from the Fried Foods Workstation can be received and stored in the KMS and/or the Control System, or evaluated, adjusted, and re-entered to "fine-tune" the process on a continuing basis.

[0333] Generally, the Control System can comprise two loops, shown in FIG. 70. The primary loop is the "Order-to-Package" loop, whereby the Master Control takes an Order Event input from the POS and directs the appropriate Packaging Module subsystem to package and deliver an appropriate portion of product. A secondary loop is the "Buffer Replacement" loop, where the Master Controller receives an Inbound Event signal from the Packaging Module that its buffer inventory of ready-to-package fried product is low and additional product must be dispensed and fried. As currently specified, all products other than salted French fries typically can have a default buffer inventory of zero, meaning that an order for that (other) product will immediately initiate a full dispense-fry-package (if packaged by the System) production routine.

[0334] In accordance with one aspect of this embodiment of the Control System, the Fryer Module vat operation is not directly controlled by the production demand cycle. Each fry vat of the fry module will operate continuously and on a pre-set uniform operating cycle. Frozen product is dropped into the fry module when additional inventory is called for. The product is fried according to the pre-set cooking cycle and then is dumped into the Packaging (or Protein) Module receiving apron. None of the cooking cycle is affected by order demands, or inventory conditions. In one embodiment, the Control System can vary the time between incremental rotation and speed of rotation of fry wheel 410 to accommodate for varying conditions, such as the level of cooking oil in the fry vat. The level of cooking oil can vary as a result of the amount of product that is being fried in a particular fry vat, since product present in the fry vat displaces cooking oil, thereby raising the level of cooking oil in the fry vat particularly since the product is held below the cooking oil surface during a cooking cycle. Preferably, to ensure the workstation reliability and system uptime, extensive control redundancy can be provided. As a result, the control subsystems for each Fryer Module vat and each Dispensing Module chute are designed and constructed as individual units that operate even if one or more subsystem fails.

[0335] Additionally, the control of the Dispensing Module freezer environment and operation can be an independent subsystem.

[0336] Preferably, the Control System includes the capability to operate all modules individually. This allows the

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operator to disconnect and remove a module from the network and operate the remaining modules in a semi-automatic method, manually performing some of the operations. Preferably, there are controls on each module that permit an operator to operate that module's functions locally

[0337] Orders for product are preferably processed sequentially as they are received, although the specific products within a customer order may be arranged in a logical manner as desired. The Monitor will display all products being processed by the workstation from the time the order is received until it is removed from the workstation. The status of each product that is ordered can be tracked in its various stages including, for example, on order, packaged and ready to pick up, ready to manually package, and held too long

[0338] Preferably, products in the process of being fried can also be tracked, and cooking times for each basket in each wheel will count down to when product is ready to package

[0339] Master Controller

[0340] In one embodiment, the Master Controller 110 hardware may suitably comprise, or equivalent:

[0341] Intel Pentium III (or higher) with 1.0 GHz (or higher) CPU

[0342] Ethernet network interface and hub

[0343] 256 MB (or more) system RAM

[0344] 20 GB (or more) hard disk drive

[0345] Touch-Screen Monitor Interface

[0346] Plug and Play Touch-Screen Monitor

[0347] SCK Gateway (Ethernet)

[0348] Interconnect cabling (as needed)

[0349] Optional Keyboard and pointing device (mouse) for installation and maintenance purposes

[0350] Typical operating system software requirements are:

[0351] Windows 2000 professional (or server) SP4 or higher

[0352] A suitable Database Server, such as Fast SCK Version 3.0 (or higher) from Fast, Inc. of Stratford, Conn.

[0353] Fast SCK Version 3.0 (or higher) Utility Applications (SCK Editor, SCK Engine, SCK Events, and SCK Site Editor) from Fast, Inc.

[0354] The Subsystem Interface Modules provide the functionality to communicate specific control events (information) conditions, and/or commands to and from the Master Controller. These modules typically can be incorporated into the circuitry of controller boards. In cases where the network needs to interface with a control subsystem (such as PLCs, for example), appropriate imbedded memory interface (input-output) circuit cards known in the art can be utilized. All of the foregoing hardware and software or equivalent is readily available or can be produced by those skilled in the art

[0355] Fryer Controller

[0356] The frying of the frozen product is controlled by a combination of cooking oil temperature and the time the frozen product is immersed in the cooking oil. Frying is accomplished by moving the frozen product through the heated cooking oil by a rotating fry wheel. As previously described, a programmable stepper or other motor can provide the desired precisely controlled movement of the fry wheel.

[0357] The following Table I lists typical control parameters and several optional parameters that can be used, if desired

TABLE I

Fryer Module Control Signals (One set for each of 4 Product Lanes)			
Description	Input	Output	Op. Adj
Set Temperature	X		X
Actual Temperature		X	
"Ready" Band Width		X	
Temperature Offset	X		
C or F	X		X
Probe #1	X		
Heater Relay #1		X	
Total Cook Time	X		X
Jog Speed	X		
Jiggle Time	X		
Cleaner Level		X	
Oil Fill		X	
Cleaner Fill		X	
Probe #2	X		
Heater Relay #2		X	
Flex Time	X		

[0358] FIG. 71 depicts a typical motor/fry wheel/basket cycle. Virtually every parameter can be fixed or adjustable as desired. For example, during one typical cycle, which may be for a preset period of time that is one-quarter of the cooking time for food contained in a compartment, fry wheel 410 is rotated clockwise 45° in the direction of arrow K of FIG. 13. After some period of time after the 45° incremental rotation, a basket shaking simulation of back and forth rotation occurs over a period of about two seconds. After a 0 to 10 second delay, another basket simulation shaking occurs. Thereafter, a period of time ("Basket Load Window") is available for loading another compartment, such as compartment 436 with a charge of French fries or other food to be fried. Thereafter, a "no load zone" or relatively short period of time towards the end of the cycle is set aside just prior to another 45° fry wheel 410 rotation in the direction of arrow K, which commences another cycle. During each cycle, three "home routines" can be employed, one after each rotation of fry wheel 410 to accurately locate fry wheel 410 so that it is properly positioned with the upper end of compartment bottom 508 of one of fry wheel 410 compartments adjacent discharge 498 and another of the compartments properly aligned to receive a charge of French fries or other food to be fried, such as from food dispensing device 200.

[0359] To ensure proper operation of the basket/fry wheel, including positioning the unit precisely for smooth loading and complete unloading, the basket/fry wheel position must be constantly synchronized. To do this, a "homing" sensor

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circuit can be utilized that resets the home position after every move of the wheel. This sensor preferably is electro-magnetic and is impervious to dirt and grease build up and has no moving parts although any suitable sensor can be used

[0360] Dispensing Controller

[0361] The Dispensing Module control system 114 separates functions by the product delivery lane they support. In one embodiment, where there are four delivery lanes, there are four control subsystems. Each subsystem controls a vibrating product conveyor, a portioning load cell, and a dump actuator. Additionally, there are optional module configurations that affect the controls design. If lanes 1, 2, and/or 3 are configured with bulk food hoppers, a product level sensor can be provided to alert operators to reload frozen product before the hopper is empty. If each of lanes 2, 3 and/or 4 are configured with an array of coil magazines for food items, the controls must sequentially switch power to each of the motors in the lane to maintain a constant flow of frozen product.

[0362] Table II lists defined control signal parameters for each of the Dispensing Module Lane controllers:

TABLE II		
Dispensing Control Signals (One set for each of 4 Product Lanes)		
Description	Input	Output
Load-Small Qty	X	
Load-Large Qty	X	
Load-Coil A	X	
Load-Coil B	X	
Load-Coil C	X	
Load-Coil D	X	
Load-Coil E	X	
Ready to Dump		X
Vibrator Frequency	X	
Bulk Fill Level		X
Time Out		X
Overweight		X
Clean Out	X	

[0363] Freezer Controller

[0364] In addition to properly dispensing products into the Fryer Module, the dispensing device 200 control 114 must also maintain a proper frozen environment for all products. To accomplish this, another controller subsystem can be provided. Table III lists the applicable control signal parameters for the freezer subsystem. A safety circuit interrupts all dispensing activity when the aisle door is opened.

TABLE III			
Freezer Control Signals			
Description	Input	Output	Op Adj
Set Temperature	X		X
Actual Temperature		X	
Aisle Door Open		X	

[0365] The separation of the Dispensing Module controls into these five subsystems when there are five makes for a

convenient mechanical arrangement in the base of the module, and allows for the required flexibility given the configuration options.

[0366] In one embodiment, for manual operation, four "dispense" buttons are provided, one for each lane. One button would cause the release of a pre-set portion of the frozen product for that lane. The controls preferably should be located so the operator could by visual observation determine the appropriate Fryer basket to make sure the product dispenses into the proper basket.

[0367] Packaging Controller

[0368] Packaging Controller 118 for the Packaging Module incorporates several event signal generators for the control system to sense or read. The main Packaging Module or device 600 elements are depicted in FIGS. 25-29. In one embodiment, the Packaging Module or device control system includes two subsystems within the Packaging Module, the packaging subsystem and the heated food storage device 635 that can be used in place of packaging device 600.

[0369] The Packaging Subsystem

[0370] The packaging control subsystem initially interfaces with the Packaging Module PLC and sends packaging device 600 a signal to start the sequential operation of packaging one of an appropriately-sized portion of French fries. The actions and reactions of all the electromechanical devices (e.g., container handling system 610, dispensing member 606, overflow member 613, load cell 702 and chute mechanism 608) can be, if desired, sequenced and controlled by the local on-board controller (i.e., PLC) and not Master Controller 110.

[0371] Once the automated arm 764 sets the filled package of fries on conveyor 614 and the receptacle load gate 926 opens to allow receptacle 612 to move to the pick up area, a signal will be sent back to Master Controller 110 indicating that the particular order of fries is ready for pick up. Until that receptacle 612 moves to the return gate 928 (located at the operator right front of the Packaging Module) and the gate permits receptacle 612 to move therepast after receptacle 612 is empty, Master Controller 110 will believe (and display) that the order of fries is waiting to be picked up. Preferably, the crew member will pick up fries from right to left to ensure that the order sequence is followed and that the oldest fries are served first.

[0372] Because the number of receptacles 612 that can fit between gate 926 and return gate 928 typically is limited, Master Controller 110 intelligence preferably keeps track of how many orders of fries are in the pick up cue. This allows audible/visual alerts to be triggered on the Monitor to remind the crew that orders have been waiting. Also, even if orders are picked out of sequence, the Master Controller will remember what was on an empty receptacle 612 and clear it when it passes return gate 928.

[0373] Preferably, the Master Controller is configured to remember the hold time of each packaged fry order. If the order has not been picked up in time, the Monitor will alert the operator by audible/visual signal to "waste" that order.

[0374] The Secondary Loop

[0375] The remainder of the Packaging Module or device 600 control 118 functions address the secondary loop,

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"buffer inventory replacement" Preferably, there are two typical system requirements for the buffer inventory: (1) there must be a minimum amount of fries in member 606 or chute mechanism 608 to completely fill the next packaging order (that is, one portion of a given size); and (2) the buffer inventory is low and needs to be replenished

[0376] For the first requirement, if there is insufficient buffer inventory to fill the package, chute mechanism 608 is disabled and an error message alarm is sent. This condition should not happen, but the control intelligence prevents packaging device 600 from under filling an order.

[0377] During normal operations, the level of fries in the buffer inventory will drop to a level where an inventory replenishment order will be initiated. In that event, Master Controller 110 can signal dispensing device 200 to start its fill sequence. This process should typically start soon enough that the replacement product can be fried, salted, and added to the dispensing member 606 before the "out-of-product" condition is reached. The KMS data can be integrated into the Master Control intelligence to help insure that there is replacement product in process before the actual need arises. This capability minimizes order delivery delays while also preventing the dispensing member 606 inventory growing beyond actual need.

[0378] The dispensing member 606 inventory can be managed in a number of ways, as desired. For example, any of the following can be utilized and implemented by one of ordinary skill in the art: (a) direct sensors; (b) a load cell that constantly weighs the buffer inventory; and (c) a dynamic empirical calculation.

[0379] The dynamic empirical calculation embodiment uses the Master Controller to constantly calculate how much product has been added to dispensing member 606, and subtract out the portion packaged, any bonus amount, waste, and a safety factor. This empirical total will then be compared to pre-set "reload" levels. The formula may also include how much product is in process. In all cases, the buffer inventory level can be adjusted during the day to reflect actual sales levels.

[0380] The controls system design for all other (i.e., non-salted French fries) products is that the same control process would be used, but that the "buffer inventory" for those products would be defaulted to zero. That is, an order for hash browns would immediately signal an "out-of-inventory" condition and launch an "inventory replacement" command to the dispensing device 200. Later, if the need arises, controller intelligence would allow the operator to utilize some buffer inventory for these products.

[0381] Optionally, a provision can be made for unsalted French fries. Unsalted French fries would be handled like the non-French fries products. When an order for unsalted French fries is received, Master Controller 110 will signal the Packaging Module to move diverter bar 605. The next load of French fries coming from the Fryer Module will then be diverted to a portion of chute 604 of packaging device 600 for manual packaging. The extra unsalted fries can be manually returned to chute 604.

[0382] An important feature of the automated system is to maintain product integrity. One facet of that is to dispose of product that has exceeded its authorized holding time. Master Controller 110 will remember when each load of

French fries came out of fry device 400. The mechanical design of packaging device 600 assures a substantially "first in-first out" product movement. How long the "oldest" fries have been in dispensing member 606 is tracked by Master Controller 110 or packaging device controller 118, as desired. Whenever the allowable holding time has been reached, Master Controller 110 will signal the Packaging Module subsystem Controller 118 to start the buffer waste cycle (or the packaging device Controller 118 can directly control this function). It is possible that some French fries in the buffer will not have reached their limit, but through control parameter refinement, this can be minimized. Table IV lists the control signals for one embodiment of the packaging control subsystem:

TABLE IV

Packaging Control Signals			
Description	Input	Output	Op. Adj.
Package #1	X		
Package #2	X		
Package #3	X		
Package #4	X		
Divert Fries	X		
Produce #5	X		
Produce #6	X		
Produce #7	X		
Produce #8	X		
Produce #9	X		
Dump Buffer	X		
Buffer Low		X	
Buffer Full		X	
Receptacle Loaded		X	
Receptacle Empty		X	
Time out-System 610		X	
Product #5-9 Picked		X	

[0383] Holding Controller

[0384] The other control subsystem is that dedicated to holding product at proper temperatures. Generally, a standard temperature controller with timer channels to manage all holding functions can be utilized, as is known in the art.

[0385] Table V lists the various control parameters for the holding control subsystem for food holding device 635:

TABLE V

Holding Control Signals			
Description	Input	Output	Op. Adj.
Buffer Temp Set	X		X
Buffer Temp Act		X	
Pick Up Temp Set	X		X
Pick Up Temp Act		X	
Apron Temp Set	X		X
Apron Temp Act		X	
Holding Temp Set	X		X
Holding Temp Act		X	
Holding Time #1 Start	X		
Holding Time #1 End	X		
Holding Time #2 Start	X		
Holding Time #1 End	X		

[0386] Touch-Screen Monitor

[0387] The Touch-Screen Monitor is the primary system user interface and can be considered part of the Master

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Controller configuration. The Monitor has four main functions: (1) display the status of fried foods orders; (2) allow the operator to manually control the system; (3) alert the operator to any needed manual intervention; and (4) allow the operator to reconfigure the workstation and/or change the individual operating parameters

[0388] The Monitor display can be configured as desired. Preferably, the main display menu is simple, uncluttered and only presents the basic information needed to track ongoing order status. A sample Monitor display layout is shown in FIG. 72

[0389] In the illustrated embodiment, products on order would appear as horizontal rows of the appropriate product (type and portion size) icon, reading from the left edge of the screen. All products from a single POS customer order would appear on a single line. As additional POS orders are entered, the screen would refresh, moving the older orders down a line. Products on order, and not yet ready for pick up would appear as gold icons.

[0390] Across the bottom of the screen would appear the same number of locations as there are packaging device 600 receptacles 612 in the pick up zone. As packages of fries are placed on receptacles 612 and the receptacles 612 travel within the pick up zone, the appropriate icon will disappear from the "on order" line and reappear as a green icon in the spot where its receptacle is. When a package is removed from a receptacle and that receptacle passes return gate 928, the display icon will disappear from the screen

[0391] In one embodiment, should the "hold timer" for a packaged product expire before it is picked up, its green icon will change color (i.e., to red) and/or flash. In another embodiment, an audible alarm can be provided as well, indicating clearly that this product should be wasted.

[0392] Across the top of the screen is a line of control "buttons." There can be one for each product (again, type and portion size). The system is programmed so that touching the button on the screen will enter an order for one each of that product. There is also a screen button at the upper right corner of the screen that enables the operator to change the screen display to the "Settings" screen

[0393] The "Settings" screen layout is depicted in FIG. 73. From this screen, the operator may now configure all the operating settings for the product to be run in each product lane. The individual settings may include dispensing load size(s), fry vat temperature, cooking cycle time, buffer inventory level, packaging device Module heater setting, and other settings as desired. In this embodiment, all settings for a particular product are linked to that product. The operator can merely scroll in each product lane and signify the product that will be run in it. Master Controller 110 will then set all operating parameters for that product. If it is necessary to check or adjust an individual control setting (such as cook time), the operator can scroll through the items in the "settings" box for that lane and product. Then, using the "up" and "down" keys, readjust the setting and press the "enter" key to reset.

[0394] If required, a secure "manager only screen" can be configured to allow someone to adjust and/or reset selected operating parameters. Access to this screen and these settings would require some type of password to prevent any non-authorized store employee from changing basic system parameters.

[0395] Operator alert messages or alarms (e.g., bulk product low—refill now; "bridging/time out"—clear lane 2; etc.) will appear as an "error message box" in the center of the screen, along with some type of audible alarm.

[0396] While the invention has been described with respect to certain preferred embodiments, as will be appreciated by those skilled in the art, it is to be understood that the invention is capable of numerous changes, modifications and rearrangements and such changes, modifications and rearrangements are intended to be covered by the following claims

1. An automated method of packaging cooked French fries in an individual portion-sized French fry container comprising:

delivering a quantity of cooked French fries to one or more compartments of a rotatable dispensing member;

rotating the dispensing member to cause the French fries to fall from the one or more compartments into a French fry dispensing chute;

dispensing the French fries from the chute and depositing the French fries into the individual portion French fry container

2. The method of claim 1 further comprising weighing the French fries in the chute before dispensing the French fries to the container

3. The method of claim 1 further comprising applying heat to French fries contained in one or more compartments of the rotatable dispensing member.

4. The method of claim 1 further comprising applying seasoning to the quantity of French fries

5. The method of claim 4 wherein said applying comprises using gravity to cause the seasoning to travel through a nozzle and onto the French fries

6. The method of claim 5 further comprising locating the nozzle above the quantity of French fries to be seasoned

7. The method of claim 1 further comprising automated shaking the individual portion French fry container after said dispensing

8. The method of claim 7 wherein said shaking comprises back and forth movement through an arc, said individual portion French fry container in a generally vertical axis

9. The method of claim 8 wherein said rotating back and forth encompasses a generally circular arc in the range of from about 3-20°

10. The method of claim 8 further comprising raising and lowering said container during said rotating

11. The method of claim 1, wherein when dispensing French fries from the chute to the individual portion container, some of the dispensed French fries are not deposited in the individual portion container, further comprising collecting the not deposited French fries

12. The method of claim 11 further comprising returning the not deposited collected French fries to the chute

13. The method of claim 11 comprising collecting the not deposited French fries in a rotatable collection member

14. The method of claim 13 further comprising rotating the rotatable collection member to return the not collected French fries to the chute

15. The method of claim 14 further comprising rotating the rotatable collection member to deposit the collected French fries directly to the chute

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16. The method of claim 14 further comprising rotating the rotatable collection member to deposit the collected French fries into the French fry dispensing chute for subsequent dispensing to another individual portion French fry container

17. The method of claim 1 further comprising holding the individual portion French fry container in position to receive the French fries from the French fry dispensing chute

18. The method of claim 1 further comprising holding the individual portion French fry container with an automated arm in position to receive the French fries from the French fry dispensing chute

19. The method of claim 18 further comprising shaking the individual French fry container by movement of said automated arm after said dispensing

20. The method of claim 19 wherein said shaking is performed by rotation of said automated arm about a generally vertical axis.

21. The method of claim 19 wherein said shaking is performed by up and down vertical movement of said automated arm.

22. The method of claim 20 wherein the rotation of the automated arm moves the French fry container back and forth in an arc.

23. The method of claim 22 wherein the arc is generally circular and encompasses an angle in the range of from about 3 to about 20 degrees.

24. The method of claim 23 wherein the angle is about 5 degrees.

25. The method of claim 1 further comprising obtaining and holding the individual portion container with an automated device prior to said dispensing from the chute

26. The method of claim 25 further comprising obtaining the individual container to be filled from a stack of individual portion French fry containers

27. The method of claim 25 wherein the individual container is in an unerected state when said obtaining is performed and the method further comprises erecting the unerected individual portion container prior to said dispensing from the chute

28. The method of claim 25 further comprising before said obtaining, selecting and holding with the automated device an individual portion-sized container of a desired size from a plurality of different sizes of individual portion-sized containers that can be selected and held by said automated device

29. An automated method of packaging cooked food in an individual portion-sized food container comprising:

delivering a quantity of cooked food pieces to a rotatable dispensing device;

rotating the dispensing member to cause at least one of the food pieces to fall from the one or more compartments into a food dispensing chute;

dispensing the at least one food piece from the chute and depositing the at least one food piece into the individual portion food container

30. The method of claim 29 further comprising weighing the at least one food piece in the chute before dispensing the at least one food piece to the container

31. The method of claim 30 further comprising depositing an additional amount of food pieces into the food dispensing chute by rotating the dispensing member until at least a desired food weight is reached.

32. The method of claim 29 further comprising applying seasoning to the at least one food piece

33. The method of claim 31 wherein said applying comprises injecting compressed air to propel seasoning through a nozzle and onto the food pieces.

34. The method of claim 33 further comprising locating the nozzle above the quantity of French fries to be seasoned

35. The method of claim 29, wherein when dispensing food pieces from the chute to the individual portion container, some of the dispensed food pieces are not deposited in the individual portion container and further comprising collecting the not deposited food pieces

36. The method of claim 35 further comprising returning the not deposited collected food pieces to the rotatable dispensing device

37. The method of claim 35 comprising collecting the not deposited food pieces in a rotatable collection device

38. The method of claim 37 further comprising rotating the rotatable collection member to return the not collected food pieces to the rotatable dispensing member

39. The method of claim 38 further comprising rotating the rotatable collection member to deposit the collected food pieces to a chute which then directs the French fries to the rotatable dispensing member.

40. The method of claim 38 further comprising rotating the rotatable collection member to deposit the collected food pieces into the food dispensing chute for subsequent dispensing to another individual portion food container

41. The method of claim 29 further comprising holding the individual portion food container in position to receive the at least one food piece from the food dispensing chute.

42. The method of claim 29 further comprising holding the individual portion food container with an automated arm in position to receive the at least one food piece from the food dispensing chute

43. The method of claim 29 further comprising obtaining and holding the individual portion food container with an automated device prior to said dispensing from the chute

44. The method of claim 43 further comprising obtaining the individual container to be filled from a stack of individual portion food containers

45. The method of claim 43 wherein the individual container is in an unerected state when said obtaining is performed and the method further comprises erecting the unerected individual portion container prior to said dispensing from the chute

46. An automated method of packaging French fries in an individual portion-sized French fry container comprising:

delivering a quantity of French fries to a French fry dispensing chute;

selecting and holding with an automated device an individual portion-sized container of a desired size from a plurality of different sizes of individual portion-sized containers that can be selected and held by said automated device;

moving the selected individual portion-sized container by the automated device to a location for receiving French fries from the dispensing chute; and

dispensing French fries from the chute and into the French fry container

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47. The method of claim 46 further comprising thereafter depositing the French fry container onto a conveyor by operation of the automated device

48. The method of claim 47 further comprising transporting the deposited French fry container to a human operator French fry pickup location

49. The method of claim 46 wherein the individual portion-sized French fry container is unerected and the method further comprises, after said selecting, erecting the selected individual portion-sized French fry container by the automated device

50. The method of claim 46 wherein said automated device comprises a partial vacuum suction device for holding the individual portion-sized French fry container and said holding comprises applying a partial vacuum through a suction device to the French fry container

51. The method of claim 50 further depositing the French fry container onto a surface by operation of the automated device and releasing the French fry container

52. The method of claim 51 further comprising releasing the French fry container after said depositing

53. The method of claim 51 wherein said releasing is performed by reducing the vacuum applied by the suction device to the French fry container sufficiently to cause the French fry container to be disengaged from the automated device.

54. The method of claim 48 wherein said transporting is performed by a conveyor

55. The method of claim 47 wherein said depositing comprises placing the French fry container on a transportable member

56. The method of claim 55 wherein said depositing comprises placing the French fry container in an upright position on the transportable member

57. The method of claim 56 wherein said transportable member has a recessed volume and the method further comprises maintaining said French fry container in an upright position on the transportable member by cooperation of the recessed volume and the French fry container

58. The method of claim 48 wherein said depositing comprises placing the French fry container on a magnetically transportable member and said transporting is performed by a magnetic conveyor

59. The method of claim 55 further comprising preventing movement of the transportable member when containing a French fry container by positioning a gate member at least partially across a location where the French fry container on the transportable member would otherwise pass in the absence of the gate.

60. An automated method of packaging food in an individual portion-sized container comprising:

delivering a quantity of food to a food dispensing chute;

selecting and holding with an automated device an individual portion-sized container of a desired size from a plurality of different sizes of individual portion-sized containers that can be selected and held by said automated device;

moving the selected individual portion-sized container by the automated device to a location for receiving food from the dispensing chute; and

dispensing food from the chute and into the food container.

61. The method of claim 60 further comprising thereafter depositing the food container onto a conveyor by operation of the automated device

62. The method of claim 61 further comprising transporting the deposited food container to a human operator food pickup location

63. The method of claim 62 wherein the individual portion-sized food container is unerected and the method further comprises, after said selecting, erecting the selected individual portion-sized food container by the automated device.

64. The method of claim 60 wherein said automated device comprises a partial vacuum suction device for holding the individual portion-sized food container and said holding comprises applying a partial vacuum through a suction device to the food container

65. The method of claim 64 further depositing the food container onto a surface by operation of the automated device and releasing the food container

66. The method of claim 65 further comprising releasing the food container after said depositing

67. The method of claim 66 wherein said releasing is performed by reducing the vacuum applied by the suction device to the food container sufficiently to cause the food container to be disengaged from the automated device

68. The method of claim 62 wherein said transporting is performed by a conveyor

69. The method of claim 63 wherein said depositing comprises placing the food container on a transportable member

70. The method of claim 69 wherein said depositing comprises placing the food container in an upright position on the transportable member

71. The method of claim 70 wherein said transportable member has a recessed volume and the method further comprises maintaining said food container in an upright position on the transportable member by cooperation of the recessed volume and the food container.

72. The method of claim 62 wherein said depositing comprises placing the food container on a magnetically transportable member and said transporting is performed by a magnetic conveyor

73. The method of claim 69 further comprising preventing movement of the transportable member when containing a food container by positioning a gate member at least partially across a location where the food container on the transportable member would otherwise pass in the absence of the gate.

* * * * *

EXHIBIT P

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P.02

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

FOOD AUTOMATION - SERVICE
TECHNIQUES, INC.

Plaintiff,

v.

UNITED ELECTRIC CONTROLS
COMPANY,

Defendant.

Civil Action No.
95-CV-12663 RCL

PLAINTIFF'S RESPONSES TO DEFENDANT'S FIRST SET
OF INTERROGATORIES TO PLAINTIFF NOS. 1-15

Pursuant to Rule 33 of the Federal Rules of Civil Procedure, plaintiff, Food Automation - Service Techniques, Inc., ("FAST" or "plaintiff"), hereby responds to the First Set of Interrogatories to Plaintiff Nos. 1-15 of defendant United Electric Controls Company ("UEC").

GENERAL STATEMENT

Plaintiff's responses are made without in any way waiving or intending to waive, but, on the contrary, intending to preserve and preserving:

1. ~~Plaintiff's right to raise all questions of authenticity, relevancy, materiality, privilege and admissibility as evidence of any information provided, or documents produced, in any subsequent proceeding in, or at the trial of, this or any other action;~~

2. Plaintiff's right to object to the use of the information provided, or the documents produced, in any subsequent proceeding in, or at the trial of, this or any other action on any other grounds;

3. Plaintiff's right to object at any time to other interrogatories or document requests, or to any other discovery involving the information provided, the subject matter thereof, and/or the produced documents; and

4. Plaintiff's right to amend its responses or supplement its production if subsequent inspection of the plaintiff's files or further discovery uncovers additional

documents and/or information called for by these interrogatories, as it is early in the discovery period and the plaintiff's investigation of the facts and the evidence pertinent to this action is ongoing.

Unless otherwise indicated, words and terms used in the following responses shall be construed in accordance with their normal meaning and connotations, and shall not be interpreted as terms statutorily defined or used in the Patent Laws, and plaintiff specifically disavows any such meaning or connotation that might be given to such terms.

GENERAL OBJECTIONS

1. Plaintiff objects to defendant's definition of the term "FAST" in Definitions paragraph A as legally improper, overly broad, unduly burdensome, and not reasonably calculated to lead to the discovery of admissible evidence to the extent that it includes "outside counsel." Plaintiff further objects to Definitions paragraph A on the stated grounds to the extent that the term "FAST" includes "consultants" for plaintiff. Information or documents in the sole possession of consultants are outside the possession, custody or control of plaintiff.

2. Plaintiff objects to defendant's definition of the terms "document" and "documents" in Definitions paragraph B to the extent that it includes information and documents in the possession, custody or control of plaintiff's outside attorneys.

3. Plaintiff objects to defendant's interrogatories to the extent that they seek information or documents that are subject to confidentiality agreements, court orders or stipulations and/or obligations of confidentiality to third parties.

4. Plaintiff objects to defendant's interrogatories to the extent that they seek information or documents protected from discovery by privilege, including without limitation, the attorney-client privilege and/or work product immunity. Plaintiff hereby claims such privilege and immunity and objects to such discovery on that basis.

5. Plaintiff objects to defendant's interrogatories to the extent that they purport to seek at this time all facts and information that form the basis for any of plaintiff's contentions and/or allegations because discovery is at an early stage and significant information required to more fully respond is in the sole possession of the defendant. Defendants' unduly limited document production and failure to comply with the bulk of plaintiff's document requests further precludes plaintiff's ability to respond at this time.

The foregoing General Objections shall be deemed continuous throughout the responses and are hereby incorporated by reference in each of the responses to the specific interrogatories which follow.

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INTERROGATORY NO. 1.

Describe the conception of the purported invention of the '948 patent by providing at least the following information:

- (a) the earliest date of such conception;
- (b) all facts and activities concerning such conception; and
- (c) identify all persons involved with such conception.

RESPONSE TO INTERROGATORY NO. 1

The invention(s) described and claimed in the '948 patent was conceived at least as early as about March 16, 1987. The invention(s) described and claimed in the '948 patent was conceived in the course of developing an advanced digital programmable oven controller to fulfill industry need for a device having features that facilitated the convenient, accurate, and reproducible preparation of a broad range of food products, particularly in "fast food" settings and commercial kitchens. Bernard G. Koether and Mario Pasquini each contributed to the conception of the invention(s) described and claimed in the '948 patent.

The additional information sought by this interrogatory may be derived or ascertained from documents and business records that will be produced by FAST, for example, product specifications, software summaries, and trip reports concerning the research and development of FAST's digital programmable oven controllers, pursuant to Rule 33(d), Fed. R. Civ. P.

INTERROGATORY NO. 2.

Describe each reduction to practice prior to October 29, 1987 of the purported invention of the '948 patent, by providing at least the following information:

- (a) the date of each such reduction to practice;
- (b) all activities and facts concerning each such reduction to practice; and
- (c) identify all persons involved with each such reduction to practice.

RESPONSE TO INTERROGATORY NO. 2

The invention(s) described and claimed in the '948 patent was reduced to practice at least as early as September 1, 1987. The invention(s) described and claimed in the '948 patent was reduced to practice in the course of developing an advanced digital programmable oven controller to fulfill industry need for a device having features that facilitated the convenient, accurate, and reproducible preparation of a broad range of food products, particularly in "fast food" settings and commercial kitchens. More specifically, by about September 1, 1987, FAST had constructed and successfully tested a digital programmable oven controller embodying one or more of the claims of the '948 patent in the context of providing a confidential disclosure to Kentucky Fried Chicken ("KFC") to allow KFC to

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evaluate and assess the FAST device. Bernard G. Koether and Mario Pasquini were each involved in the reduction to practice of the invention(s) described and claimed in the '948 patent.

The additional information sought by this interrogatory may be derived or ascertained from documents and business records that will be produced by FAST, for example, product specifications, software summaries, and trip reports concerning the research and development of FAST oven controllers, pursuant to Rule 33(d), Fed. R. Civ. P.

INTERROGATORY NO. 3.

Describe the first disclosure of the purported invention of the '948 patent to others by its inventor or inventors, by providing at least the following information:

- (a) the nature of such disclosure;
- (b) all facts concerning such disclosure;
- (c) identify all persons making such disclosure;
- (d) identify all persons to whom such disclosure was made; and
- (e) the date or dates of such disclosure.

RESPONSE TO INTERROGATORY NO. 3

The invention(s) described and claimed in the '948 patent was disclosed by Mario Pasquini and/or Bernard G. Koether to others within FAST, including but not limited to, Mario G. Ceste, at least as early as about March 16, 1987. The additional information sought by this interrogatory may be derived or ascertained from documents and business records that will be produced by FAST, for example, product specifications and internal memoranda concerning the research and development of FAST oven controllers, pursuant to Rule 33(d), Fed. R. Civ. P.

INTERROGATORY NO. 4.

Describe the first sale in the United States of a control system for an oven constructed in accordance with the '948 patent, by providing at least the following information:

- (a) the date of such first sale;
- (b) a description of all facts concerning such first sale;
- (c) the date of the first communication concerning such first sale;
- (d) identify the purchaser and seller; and
- (e) identify all persons having knowledge of such first sale.

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RESPONSE TO INTERROGATORY NO. 4

A control system constructed in accordance with the '948 patent was first sold in the United States by FAST to Vie de France Corporation on or about March 24, 1988. Persons having knowledge concerning this first sale include, but are not limited to, Bernard G. Koether and Mario Pasquini.

The additional information sought by this interrogatory may be derived or ascertained from documents and business records that will be produced by FAST, for example, meeting and trip reports and correspondence with Vie de France Corporation, pursuant to Rule 33(d), Fed. R. Civ. P.

INTERROGATORY NO. 5.

Describe the first offer for sale in the United States for a control system for an oven constructed in accordance with the '948 patent, by providing at least the following information:

- (a) the date of such first offer for sale;
- (b) a description of all facts concerning such first offer for sale;
- (c) the date of the first communication concerning such first offer for sale;
- (d) identify the offerer and offeree; and
- (e) identify all persons having knowledge of such first offer for sale.

RESPONSE TO INTERROGATORY NO. 5

A control system constructed in accordance with the '948 patent was first offered for sale in the United States by FAST to Vie de France Corporation in the February to March, 1988 period. Persons having knowledge concerning this first offer for sale include, but are not limited to, Bernard G. Koether, Mario Pasquini and persons within Vie de France Corporation

The additional information sought by this interrogatory may be derived or ascertained from documents and business records that will be produced by FAST, for example, meeting and trip reports and correspondence with Vie de France Corporation, pursuant to Rule 33(d), Fed. R. Civ. P.

INTERROGATORY NO. 6.

Describe the first public and/or commercial use in the United States of a control system for an oven constructed in accordance with the '948 patent, by providing at least the following information:

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- (a) the date of such first public and/or commercial use;
- (b) a description of all facts concerning such first public and/or commercially [sic] use;
- (c) identify each person who first publicly and/or commercial [sic] used a control system for an oven constructed in accordance with the '948 patent; and
- (d) identify all persons having knowledge of such first public and/or commercial use.

RESPONSE TO INTERROGATORY NO. 6

Plaintiff objects to this interrogatory to the extent that the term "commercial" as used by the defendant is vague and ambiguous.

Subject to and without waiving the foregoing, plaintiff states that a control system constructed in accordance with the '948 patent was first publicly used in the United States by Vie de France Corporation in the spring of 1988. Persons having knowledge concerning this public and/or commercial use include, but are not limited to, Bernard G. Koether, Mario Pasquini and persons within Vie de France Corporation.

The additional information sought by this interrogatory may be derived or ascertained from documents and business records that will be produced by FAST, for example, meeting and trip reports and correspondence with Vie de France Corporation, pursuant to Rule 33(d), Fed. R. Civ. P.

INTERROGATORY NO. 7

Identify each different oven control system embodying the invention disclosed in the '948 patent which FAST has manufactured, sold or offered for sale and state the dates between which FAST has manufactured, sold or offered for sale each such oven control system.

RESPONSE TO INTERROGATORY NO. 7

Information sought by this interrogatory may be derived or ascertained from documents and business records that will be produced by FAST, for example, product specifications, software summaries and summaries of sales reports, pursuant to Rule 33(d), Fed. R. Civ. P.

INTERROGATORY NO. 8

Identify each instance in which the '948 patent is or has been the subject matter of or otherwise involved in any litigation, other than the present litigation, and as to each such instance:

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- (a) state the court and case number thereof;
- (b) identify the parties involved therein;
- (c) identify the products alleged to infringe; and
- (d) if finally resolved or otherwise ended, state the basis upon which and the manner in which it was finally resolved or otherwise ended.

RESPONSE TO INTERROGATORY NO. 8

Other than the present litigation, the '948 patent has not been the subject matter of or otherwise involved in any litigation.

INTERROGATORY NO. 9.

Identify each instance in which FAST has accused any person, company, corporation or other entity, other than UEC, with infringement of the '948 patent, and, as to each such instance:

- (a) identify the person, company, corporation or entity charged;
- (b) identify the items alleged to infringe;
- (c) state the present status of such accusation; and
- (d) if an accusation has been resolved or otherwise ended, state the basis upon which and manner in which such accusation was resolved or otherwise ended.

RESPONSE TO INTERROGATORY NO. 9

Other than UEC, FAST has not accused any person, company, corporation or other entity with infringement of the '948 patent.

INTERROGATORY NO. 10.

State the basis for FAST's allegation in paragraph 5 of the Complaint that "United Electric has directly infringed, contributed to infringement, and/or induced infringement of the '948 patent in this judicial district and elsewhere in the United States, by making, having made, using, offering to sell, and/or selling oven controllers covered by one or more claims of said patent without authority." In addition to the response called for by Rule 26.5(C)(8) of the Local Rules for the United States District Court for the District of Massachusetts:

- (a) identify each product of UEC that is alleged to infringe claims of the '948 patent;
- (b) for each such product, identify the claims of the '948 patent that are alleged to be infringed;

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- (c) for each claim alleged to be infringed and for each UEC product alleged to infringe, state whether infringement is literal or under the doctrine of equivalents; and
- (d) for each UEC product alleged to infringe the '948 patent, and for each claim alleged to be infringed by that product, identify the component or components of the UEC product which correspond to each such claim element, and explain why that component or these components correspond to each claim element; and [sic]

RESPONSE TO INTERROGATORY NO. 10

UEC has made, used, offered for sale, and sold oven controllers, including but not limited to, the controller utilized or incorporated in the Eurofours/Euroven "Smart Oven Control", that satisfy each and every element of one or more of the '948 patent claims, including but not limited to, claims 2, 4, and 6, both literally and under the doctrine of equivalents.

For example, the Eurofours/Euroven "Smart Oven Control" is a digital, parameter control system for controlling the baking or heating of a food product in an oven. The "Smart Oven Control" possesses product keys which allow the selection of a programmed "recipe" or cooking profile for up to 16 products and further allows for automatic control of at least the following cooking parameters: cooking time, temperature, volumetric flow rate, and humidity. Each "recipe" or cooking profile has up to four separate stages or time intervals. All of the recited cooking parameters are independently programmable to have different values during each stage or time interval. The "Smart Oven Control" also includes a time compensation feature which automatically adjusts the cooking time based on measured values of at least one of the cooking parameters.

INTERROGATORY NO. 11.

For each claim of the '948 patent identified in response to Interrogatory No. 10(b) that is asserted to be infringed under the doctrine of equivalents:

-
- (a) explain the test for equivalency which is being employed;
 - ~~(b) explain how and why a component or components of each UEC product~~
alleged to infringe is equivalent to each element of that claim;
 - (c) explain why the prior art does not prevent the application of the doctrine of equivalents for each UEC product alleged to infringe that claim; and
 - (d) explain why there is no file wrapper estoppel for each UEC product alleged to infringe that claim.

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RESPONSE TO INTERROGATORY NO. 11

Plaintiffs object to subparts (c) and (d) of this interrogatory to the extent that they improperly require plaintiffs to assume defendant's burden of setting forth reasons as to why the doctrine of equivalents should not be applied to reach UEC's accused oven controllers.

Subject to and without waiving the foregoing, plaintiffs contend that, in the absence of literal infringement, UEC's oven controllers, including but not limited to, the controller utilized or incorporated in the Eurofours/Euroven "Smart Oven Control", infringes at least claims 2, 4, and 6 under the doctrine of equivalents because any difference between UEC's oven controllers and the '948 patent claims is "insubstantial." The insubstantiality of any differences between UEC's oven controllers and the '948 patent claims is evidenced by at least the following: (1) the claimed invention and accused products include substantially the same function, way and result; (2) persons reasonably skilled in the art know of the interchangeability of the accused and claimed elements; and/or (3) an inference of intentional appropriation of the claimed invention.

INTERROGATORY NO. 12.

State the basis for FAST's allegation in paragraph 17 of the Complaint that UEC's "infringement of the '948 patent has been and continues to be willful, wanton and deliberate, without license and with knowledge of Food Automation's patent rights."

RESPONSE TO INTERROGATORY NO. 12

UEC's infringement of the claims of the '948 patent has continued since at least as early as July 1990 with full knowledge, and in disregard of, the patent rights of FAST. UEC's knowledge of FAST's patent rights with respect to the '948 patent derives from at least two sources. UEC had knowledge of FAST's patent rights in the '948 patent as a result of correspondence between FAST's attorneys and UEC during the July-August 1990 time period. In addition, Mario Pasquini, a co-inventor of the '948 patent, was, upon information and belief, employed by UEC during the period from about May 1989 through March 1992. During the period of his employment at UEC, Mr. Pasquini had full knowledge of FAST's patent rights in the '948 patent and the technology described and claimed therein.

During his employment at UEC, Mr. Pasquini had significant responsibilities at UEC with regard to the design and development of microprocessor based oven controllers, including, on information and belief, UEC's accused oven controllers. Upon information and belief, UEC's accused oven controllers are a slavish copy of the subject matter described and claimed in FAST's '948 patent.

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INTERROGATORY NO. 13.

State the basis for FAST's affirmative defense that UEC is barred from contending that the '948 patent is invalid by application of the doctrine of assignor estoppel.

RESPONSE TO INTERROGATORY NO. 13

Mr. Mario Pasquini, as an employee of FAST and co-inventor of the '948 patent, assigned all of his rights and interest in the subject matter of the '948 patent to FAST and/or Technology Licensing Corporation. Subsequently, Mr. Pasquini left FAST and entered the employ of UEC. During the period of his employment by UEC, Mr. Pasquini had, upon information and belief, significant responsibility and involvement in the design and construction of UEC's accused oven controllers. Furthermore, UEC availed itself of Mr. Pasquini's knowledge and assistance in the manufacture, use and sale of infringing oven controllers. As a result, a relationship of privity exists between UEC and Mr. Pasquini with the effect that UEC is precluded from contesting the validity and enforceability of the '948 patent in the present action under the doctrine of assignor estoppel.

INTERROGATORY NO. 14.

State the basis for FAST's estimate of 10 million dollars in lost profits, as set forth in paragraph C, on page 5 of FAST's Rule 26(a)(1) disclosure. Included in your answer, in addition to the response called for by Rule 26.5(C)(8) of the Local Rules for the United States District Court for the District of Massachusetts, should be a detailed explanation of how the damage figure was calculated.

RESPONSE TO INTERROGATORY NO. 14

FAST objects to this interrogatory because the Advisory Committee Notes to the 1993 amendments to Rule 26 specify that "a party would not be expected to provide a calculation of damages which, as in many patent infringement actions, depends on information in the possession of another party or person." FAST's initial estimate of damages under Fed. R. Civ. P. Rule 26(a)(1) thus is not a "claim, assertion, allegation or contention" within the meaning of Local Rule 26.5(C)(8) as to the actual amount of damages FAST expects to prove at trial. FAST further objects that, pending completion of additional discovery, and in particular, receipt of documents and information previously requested from defendant but which defendant has failed to produce, FAST is not able to provide a calculation of the actual damages it will claim at trial.

Without prejudice to or waiver of the foregoing objections, and without prejudice to its right to claim additional elements of damages at trial, FAST's initial estimate of damages under Rule 26(a)(1) was based upon a general estimate of defendant's unit sales of infringing products, the actual number of which is in defendant's possession; calculation of FAST's lost profits on such estimated sales; calculation of FAST's lost profits on repair and maintenance

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P. 11

of such products, and price erosion on FAST's own sales of products within the scope of the '948 patent.

INTERROGATORY NO. 15.

Specify the royalty rate which FAST contends would be reasonable royalty pursuant to 3.5 [sic] U.S.C. §284 for those products for which lost profits would not be appropriate and state the basis for this royalty rate.

RESPONSE TO INTERROGATORY NO. 15


FAST objects that this is an improper contention interrogatory. Pending completion of additional discovery, and in particular, receipt of documents and information previously requested from defendant but which defendant has failed to produce, FAST is not yet able to specify an appropriate royalty rate that might be used at trial in lieu of a calculation of actual damages.

Objections to the foregoing interrogatories are made by attorneys for defendant pursuant to Rule 33(b)(2) of the Federal Rules of Civil Procedure.

Date: December 13, 1996

By:

James Coyne King (BBO # 272620)
HANIFY & KING
Professional Corporation
One Federal Street
Boston, Massachusetts 02110
(617) 423-0400



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Jonathan E. Moskin
Todd A. Wagner
Leo Merken
PENNIE & EDMONDS
1155 Avenue of the Americas
New York, New York 10036-2711
(212) 790-9090

Attorneys for
FOOD AUTOMATION - SERVICE
TECHNIQUES, INC.

STATE OF CONNECTICUT)
)ss.
COUNTY OF)

Mario G. Ceste

Sworn to before this _____ day of _____, 199_____

Notary Public

My Commission Expires:

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P.14

CERTIFICATE OF SERVICE

I hereby certify that true copies of **PLAINTIFF'S RESPONSES TO DEFENDANT'S FIRST SET OF INTERROGATORIES TO PLAINTIFF NOS. 1-15** were served this 13th day of December, 1996 upon counsel for United Electric Controls Company as follows:

By First Class Mail upon:

John Foscett, Esq.
Deutsch, Williams, Brooks,
DeRensis, Holland & Drachman, P.C.
99 Summer Street
Boston, Massachusetts 02110

Lawrence M. Green, Esq.
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02210

Fred Wilgus

EXHIBIT Q

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF CONNECTICUT**

TECHNOLOGY LICENSING	:	
CORPORATION, a Florida corporation, and	:	
FOOD AUTOMATION – SERVICE	:	CIVIL ACTION
TECHNIQUES, INC., a Delaware	:	NO. 305CV1245 RNC
corporation,	:	
	:	
Plaintiffs,	:	
v.	:	
	:	
TURBOCHEF TECHNOLOGIES, INC., a	:	
Delaware corporation,	:	
	:	
Defendant.	:	November 30, 2005

**PLAINTIFF FOOD AUTOMATION – SERVICE TECHNIQUES, INC.’S ANSWERS
TO DEFENDANT TURBOCHEF TECHNOLOGIES, INC.’S
FIRST SET OF CONTINUING INTERROGATORIES TO PLAINTIFF
FOOD AUTOMATION – SERVICE TECHNIQUES, INC.**

Pursuant to Rule 33 of the Federal Rules of Civil Procedure, Plaintiff Food Automation – Service Techniques, Inc. (“FAST” or “Plaintiff”) hereby responds to Defendant TurboChef Technologies, Inc.’s First Set of Continuing Interrogatories to Plaintiff Food Automation – Service Techniques, Inc. Nos. 1-12.

GENERAL STATEMENT

Plaintiff’s responses are made without in any way waiving or intending to waive, but on the contrary, tending to preserve and preserving:

1. Plaintiff’s right to raise all questions of authenticity, relevancy, materiality, privilege and admissibility as evidence of any information provided, or documents produced, any subsequent proceeding in, or at the trial of, this or any other action;

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MGC 00248

2. Plaintiff's right to object to the use of the information provided, or the documents produced, in any subsequent proceeding in, or at the trial of, this or any other action on any other grounds;

3. Plaintiff's right to object at any time to other interrogatories or document requests, or to any other discovery involving the information provided, the subject matter thereof, and/or the produced documents; and

4. Plaintiff's rights to amend its responses or supplement its production if subsequent inspection of the Plaintiff's files or further discovery uncovers additional documents and/or information called for by these interrogatories, as it is early in discovery period and the Plaintiff's investigation of the facts and the evidence pertinent to this action is ongoing.

Unless otherwise indicated, words and terms used in the following responses shall be construed in accordance with their normal meaning and connotations and shall in no way be interpreted as terms statutorily defined or used in the Patent Laws, and Plaintiff specifically disavows any such meaning or connotation that might be given to such terms.

GENERAL OBJECTIONS

1. Plaintiff objects to Defendant's Interrogatories to the extent that they seek information or documents that are subject to confidentiality agreements, court orders, stipulations and/or obligations of confidentiality to third parties.

2. Plaintiff objects to Defendant's Interrogatories to the extent that they seek information or documents protected from discovery by privilege, including, without limitations, the attorney/client privilege and/or work product immunity. Plaintiff hereby claims such privilege and immunity and objects to such discoveries on that basis.

3. Plaintiff objects to Defendant's Interrogatories to the extent that they purport to seek at this time all facts and information that form the basis for any of Plaintiff's contentions and/or allegations because discovery is at an early stage and significant information required to fully respond is in the sole possession of the Defendant.

The foregoing general objections shall be deemed continuous throughout and are hereby incorporated by reference in each of the responses to the specified interrogatories which follow:

ANSWERS TO FIRST SET OF INTERROGATORIES

1. Identify any person whom you believe to have any knowledge of the information requested by Defendant's Interrogatories and First Request for Production of Documents and Tangible Things (including, but not limited to, any persons associated in any way with the filing or prosecution of any patent application(s) associated with the '948 Patent or the invention(s) claimed therein); and for each such person, state the facts known by or believed to be known by that person.

ANSWER:

Bernard G. Koether	The invention and reduction to practice of the '948 patent, competitor practices, the sale of ovens covered by the '948 patent
George Koether	The sale and marketing of ovens covered by the '948 patent, competitor practices
Seth Lukash	TurboChef activities
Mario Ceste	The invention and reduction to practice of the invention covered by the '948 patent, sale and marketing of ovens covered by the '948 patent
Mario Pasquini	The conception and reduction to practice of the invention covered by the '948 patent

2. Identify and describe with specificity how and by whom the invention(s) disclosed in the '948 Patent were conceived of and reduced to practice, including without limitation the dates of conception and diligence in reduction to practice, and identify all person(s) who assisted or were in any way involved, directly or indirectly, in the conception or reduction to practice of the invention(s) disclosed in the '948 Patent.

ANSWER:

The inventions described and claimed in the '948 patent were conceived to practice at least as early as March 16, 1987 and reduced to practice at least as early as September 1, 1987. The inventions described and claimed in the '948 patent were conceived in the course of developing an advanced digital programmable oven controller to fill the industry need for a device having features that facilitated the convenient, accurate and reproducible preparation of a broad range of

food products, particularly in "fast food" settings, bakeries and commercial kitchens. Bernard G. Koether and Mario Pasquini each contributed to the conception of the invention described and claimed in the '948 patent.

The inventions were reduced to practice in the course of developing an advanced digital programmable oven controller. By about September 1, 1987, FAST had constructed and successfully tested a digital programmable oven controller embodying one or more claims of the '948 patent in the context of providing a confidential disclosure to Kentucky Fried Chicken to allow them to evaluate and assess the device.

3. Identify the invention date of the invention(s) disclosed in the '948 Patent; state the priority date to which you contend each claim of the '948 Patent is entitled; describe in detail and with particularity the facts supporting any such date(s); identify all persons with knowledge of such date(s); and identify all documents concerning said date(s).

ANSWER:

Plaintiff objects to this interrogatory as being duplicative of at least Interrogatory No. 2. Plaintiff considers the conception date of the invention as disclosed in the '948 patent to be at least March 16, 1987 and the reduction to practice date at least as early as September 1, 1987. Bernard G. Koether and Mario Pasquini have the best knowledge of such dates. The additional information sought by this interrogatory may be derived or ascertained from documents and business records that are being produced by Plaintiff, for example, inventor notes concerning the research and development of Plaintiff's digital programmable oven controllers.

4. Identify and describe all facts and circumstances FAST contends constitute infringement by TurboChef of the '948 patent, including the identification of each TurboChef product by name or product number alleged to infringe the '948 patent, and for each such product, identify each and every claim that you contend is so infringed, and for each TurboChef product alleged to infringe, set forth with respect to each such claim a separate, detailed claim chart that describes in detail the basis for your contention that TurboChef's product(s) meets each and every element or limitation of such claim.

ANSWER:

Plaintiff objects to this interrogatory to the extent it asks for the basis of Plaintiff's contentions because discovery is at an early stage and more information, much of which is in possession of Defendant, is required. Notwithstanding the preliminary nature of discovery:

Claim 1. A parameter control system for controlling temperature and volumetric flow rate for an oven for heating a food product comprising:	The Turbochef C3 Oven, Tornado and High h Batch are all convection ovens which control cooking temperature and flow rate for heating food
(a) means for heating a heating medium in the oven;	All utilize recirculating rapidly moving hot air to cook food. Air electronically heated.
(b) first digitally programmed means,	All use computerized menu for cooking control. Temperature is preprogrammed to recipe set point and stored in the memory of the oven.
(b1) having temperature sensing means and	Utilizing a thermocouple to determine whether temperature in oven is within range of set point.
(b2) having product keys and,	All use product menu (item) keys to set or start recipe. (cooking process)
(b3) having a predetermined temperature control algorithm communicating with said temperature sensing means and	In accordance with recipe, temperature is set for cook process. Assume algorithm communicates with temperature sensor, otherwise no need for sensor or LO COOK TEMP indicator to indicate temperature has fallen from the set point.
(b4) having program parameter variables per product key programmable for temperature values T1, T2 ... Tn at time intervals t1, t2 ... tn, respectively, where n equals 1, 2 ... n to the number of intervals, and	Recipes may contain up to 6 segments (intervals/events). Temperature value is assigned across the segments (intervals/events) as stored in the first digitally programmed means. Temperature is set to remain constant across the segments (intervals/events) as taught by the patent. Alternatively, temperature experienced at food item is controlled by amount of time (t _n) and/or flow rate that the heated convection air is provided to food.
(b5) said digitally programmed means including closed loop heat control means controlled by said algorithm, for	Heat is maintained at recipe temperature, otherwise no need for LO COOK TEMP indicator if set point temperature provided

controlling as a first parameter the temperature of the heating medium.	to oven is not within band.
(c) Second digitally programmed means, having a predetermined volumetric control algorithm having program parameter variables per product key programmable for volumetric flow rate values V1, V2 ... Vn at time intervals t1, t2 ... tn, respectively, where n equals 1, 2 ... n to the number of intervals, for controlling as a second parameter the volumetric flow rate of the heating medium; and	User can control percentage air flow velocity (volumetric flow) of hot air during cooking from 0-100%. This can be done independently within each segment (interval/event) in increments of 10%. The desired parameters for hot air flow during each of the up to six segments (intervals/events) are stored by the oven.
(d) Said first digitally programmed means including digitally programmed means for controlling a plurality of time intervals for predetermined values of the temperature and for predetermined values of the volumetric flow rate, per product key, of the heating medium in the oven.	The product (item) key initiates the cooking process. The cooking, including cooking at the prestored temperature algorithm and the prestored air flow, occurs across the up to six segments (intervals/events) for the associated food product under the control of predetermined values for temperature and air programmed into the oven.
Claim 3. ...product key selects the programmed values of each of said parameters at predetermined intervals	Selecting the product (item) key selects the preprogrammed value for the food to be cooked.
Claim 7. ...product key is ineffective to initiate a cooking cycle unless one or more of said parameters is within one or more predetermined tolerance bands around one or more given set points	Cooking cannot begin unless the temperature of the heating element for the convection air is within a predetermined value of the set point.

5. Identify and describe all facts and circumstances FAST contends constitute inducement of infringement by TurboChef of the '948 patent, including the identification of each customer FAST alleges that TurboChef is inducing to infringe the '948 patent and each product by name or product number that constitutes direct infringement of the '948 patent.

ANSWER:

Plaintiff objects to this interrogatory as requiring attorney opinion. Plaintiff also objects to this interrogatory as it requires information that is not fully and completely developed at this point. Plaintiff answers to the extent known as follows: Defendant TurboChef has induced infringement by providing to its customers at least the accused models, identified in the Complaint and incorporated herein, with functionality that infringes one or more claims of the '948 patent. To date, TurboChef has induced at least Doctor Associate's Inc., Starbucks, Starwood Hotels & Resorts Worldwide, Inc., Hilton Hotels Corporation, Compass Group, Mansion on Turtle Creek, Hyatt, HMSHost Corporation, Loews Cineplex Entertainment Corp., The Walt Disney Company, Lambeau Field, and Petco Park to infringe the '948 patent by buying ovens capable of infringing the '948 patent and/or instructing their use to infringe the '948 patent.

6. Identify and describe with specificity all facts that support your assertion that TurboChef has willfully infringed the '948 Patent, and identify all persons with knowledge of such facts and all documents concerning such facts.

ANSWER:

The oven control industry is a small incestuous industry. FAST has been in discussions with several customer and competitor companies such as Enersyst, Burger King, YUM, Au Bon Pain, Duke, and Amana by way of example, regarding its patent portfolio and the licensing and/or exploitation thereof. Engineers and consultants for these companies, who are signatories to mutual confidentiality agreements concerning the technology embodied in the '948 patent, are now and have been employees of Defendant. They knew of the '948 patent while developing the infringing ovens.

7. Identify (by product designation name and number, trade name, and trademark) each system which you contend to be covered by the '948 Patent that is or has been manufactured, sold, offered for sale, licensed, distributed, or advertised by Plaintiffs or any licensors or licensees of Plaintiffs; and for each such system, state the date on which it was first made, used, offered for sale, sold, or licensed, identify all persons, including

outside consultants, with knowledge of any research or development pertaining to its manufacturing, construction, or design.

ANSWER:

Plaintiff objects to this request as overly broad and duplicative of interrogatory Nos. 1 and 10.

<u>MODEL NUMBER</u>	<u>1ST DATE MFG</u>
1614MXUT-STD	
1614WXUT-AEE	
IR101D8C9811	11/24/2004
IR101D8C9812	4/24/2003
IR101D8C9813	4/24/2004
IR101D8C9814	
IR101D8C9815	
IR101D8C9816	
IR101D8C9817	
IR101DV66624	9/25/2000
IR101DV66626	5/20/1999
IR101DV66631	7/13/2000
IR101DV66632	7/13/2000
IR101DV66633	6/12/2000
IR101DV66634	7/14/2000
IR101DV66635	4/3/2002
IR161D8C9802	
IR161D8C9805	
IR161D8C9808	
IR161D8C9809	
IR161D8C9810	4/4/2001
IR161DV66627	12/7/2001
IR161DV66628	

IR161DV66629	9/24/2003
IR161DV66630	11/10/1998
IR161DV66636	
IR161DVC6612	
IR161DVG6619	
IR162DV66606	
IR162DV66607	
IR163D269101	
IR163D269102	
IR163D569401	
IR165D699402	
M1004MRAA-STD	9/6/1996
M1004MRBB-STD	9/6/1996
N/V/S-INHD	

8. Identify any study or investigation that you or anyone on your behalf has performed, caused to be performed, or obtained from anyone else, whether orally or in writing, of the validity, enforceability, or scope of the '948 Patent, or of any foreign counterparts thereof, including, but not limited to, any search for prior art pertinent thereto; and identify all persons with knowledge of and all documents concerning any such study or investigation.

ANSWER:

Plaintiff objects to this interrogatory as requesting attorney/client privileged and attorney work product privileged information. To the extent any studies or investigations have occurred, those that have been formalized in writing are identified in the privilege log.

9. Please describe what you did before filing this lawsuit to investigate your allegation that TurboChef has infringed, is infringing and/or is inducing infringement of the '948 Patent; identify all persons with whom you communicated and all documents and other

materials or information you reviewed in the course of any such investigation including without limitation the dates of all such investigations; and identify all persons with knowledge of, and all documents concerning any such investigation.

ANSWER:

Plaintiff objects to this interrogatory as requesting attorney/client privileged and attorney work product privileged information. Notwithstanding or waiving the objection, Plaintiff obtained Defendant's public SEC filings, specification sheets, marketing materials, and website information for the Tornado C3 and High h-Batch ovens. Plaintiff also obtained Defendant's operations manuals and maintenance manuals for the Tornado C3 ovens. These documents were studied in light of the claims of the '948 patent.

10. Identify and describe in detail and with particularity the first offer for sale and first sale of any and all control systems covered by the '948 Patent, including but not limited to the circumstances of the sale or offer for sale, the date of the sale or offer for sale and the location of the sale or offer for sale; and identify all persons with knowledge of and all documents concerning such offers for sale or sales.

ANSWER:

Plaintiff objects to this interrogatory as it asks for information prior to the completion of Plaintiff's internal investigation. As of this answer, Plaintiff believes that a control system constructed in accordance with the '948 patent was first sold in the United States by FAST to Vie De France Corporation on or about March 24, 1988. Persons having knowledge concerning the first sale include, but are not limited to, Bernard G. Koether and Mario Pasquini. The first offer for sale was to Kentucky Fried Chicken on or after September 1, 1987, pursuant to a confidential disclosure.

11. Please describe in detail how you obtained license under and why you have standing to sue for infringement of the '948 Patent; and identify all assignments of the '948 Patent, including for each the assignor, assignee, date, and all documents concerning the assignment.

ANSWER:

Plaintiff objects to this interrogatory as it requires business confidential information. FAST is the only licensee of the '948 patent and pursuant to the license agreement may join and participate in any litigation proceedings.

12. Please describe the circumstances under which you first became aware of the TurboChef systems or devices that you have accused of infringing the '948 patent, including without limitation the dates when you first became aware of each such system or device.

ANSWER:

Plaintiff became aware of Defendant's sale of ovens to Doctors Associates' and/or Subway® franchises as a result of general industry news in January 2005. Shortly thereafter, Plaintiff obtained TurboChef SEC materials, operations manuals and specifications sheets for various TurboChef ovens. In March 2005, Plaintiff provided to its patent attorney such information and requested that an infringement analysis be performed.

AS TO OBJECTIONS:

Edwards Angell Palmer & Dodge LLP

Counsel for TECHNOLOGY LICENSING
CORPORATION and
FOOD AUTOMATION - SERVICE
TECHNIQUES, INC., Plaintiff

Dated: November 30, 2005

By: 

Barry Kramer, Esq.
(CT 06932)

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Three Stamford Plaza
301 Tresser Boulevard
Stamford, CT 06901
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E-mail: bkramer@eapdlaw.com

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FAST

PAGE 13

AS TO ANSWERS:

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

FOOD AUTOMATION - SERVICE
TECHNIQUES, INC.

Dated: November 30, 2005

By: 

George F. Koether
President, Chief Operating Officer

CERTIFICATION

This is to certify that on the 30th day of November, 2005, a copy of the foregoing has been served upon the following:

Donna Nelson Heller
Patrick J. McHugh
William M. Tong
FINN, DIXON & HERLING LLP
One Landmark Square, Suite 1400
Stamford, CT 06901-2689
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____ Via facsimile transmission
____ Via messenger delivery
X ____ Via Federal Express
____ Via hand delivery
____ Via e-mail

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____ Via messenger delivery
X ____ Via Federal Express
____ Via hand delivery
____ Via e-mail

*Of Counsel for Defendant TurboChef
Technologies, Inc.*



Barry Kramer

EXHIBIT R

**"Innovate,
Automate,
Immigrate, or
Evaporate"****Mario G. Ceste, Esq.**
President, COO

Throughout his career, Mario has strategically managed hardware and software businesses in global high tech markets. Most recently, he is credited with the ongoing development of the company's revolutionary Smart Commercial Kitchen[®], or SCK[®] product line. Mario's experience in foodservice spans 20 years.

**Birthdate:** Feb. 28,
1954**Hometown:**
Wallingford, Conn.**Family:** Wife Rachael,
twins, Tyler and
Aleshia, and Andrea,
Laura, and Mario Ceste,
Jr.**Hobbies:** Building and
remodeling homes;
Skiing and Cigar
Smoking**Greatest personal
achievements:**
Receiving the Conn.
Small Business Success
Award and graduating
from law school &
passing the Bar Exam**Currently reading:**
*Blown to Bits: How the
New Economic of
Information Transforms
Strategy*
By Philip Evans*Rembrandts in the
Attic: Unlocking the
Hidden Value of
Patents*
By David Kline*Unleashing the Killer
App: Digital Strategies
for Market Dominance*

Mario strategically repositioned several companies in electronic instrumentation markets. As vice president and general manager at Dranetz Technologies, he led the development of Windows/NT based remote monitoring systems. While president/ceo of Interplex Electronics, he led new product innovations that earned the company a 1992 Connecticut Small Business Success Award.

Mario holds a BSEE from the University of Bridgeport where he specialized in electronics and computer science engineering. He holds a JD from Quinnipiac University School of Law of Hamden, Conn. Mario was admitted to the Connecticut Bar in June 2001 and received his Doctorate with honors recognition for excellence in clinic work. He was instrumental in creating a volunteer clinic providing legal assistance to physically challenged individuals. Mario personally has six US Patents and is licensed as a registered Patent Attorney at the US Patent and Trademark Office.

Mario has held positions on the Z83 Sub-committee for Gas Appliance safety standards and the UL Industry Task Group for Reliability in Electronics. He is also the past Chairman of the Connecticut World Trade Association (CWTA). He has been an adjunct professor at his Alma Matter teaching advanced microprocessor design.

Mario is the current chairman of the **Technical Liaison Committee** of the North American Association of Food Equipment Manufacturers (NAFEM) and vice-chairman of the **NAFEM Data Protocol Steering Committee**. He has been a featured speaker at numerous industry events including the Electric Foodservice Council (EFC), NAFEM, and FS/TEC.

Close this window to return to the FAST Team

FAST Bios - Mario Ceste

http://www.fastinc.com/bios_mceste.htm

By Larry Downes &
Chunka Mui

Wednesday, February 21, 2007

1-800-FASTRON

Questions or comments: webmaster@fastinc.com

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Service Techniques, Inc.

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[International Distributors](#) | [Contact/Directions](#) | [Employment](#) | [Links](#) | [Home](#)

EXHIBIT S

Europäisches
PatentamtEuropean
Patent OfficeOffice européen
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

File No.: T 1009/95 - 3.2.4 Munich, 7 November 1997
 Patent No.: 313768
 Patentee: Food Automation-Service Techniques, Inc
 Opponent: Fa. Rational GmbH

MINUTES

of the public oral proceedings
 before the Technical Board of Appeal 3.2.4
 of 7 November 1997

Composition of the Board:

Chairman: C. Andries

Members: R. Gryc

M. Lewenton

Time of commencement: 09.00 hours

Time of conclusion: 13.30 hours

Documents presented:

Annex: main request (claims 1 to 9), auxiliary request (claims 2 to 9, claim 1
 as main request);
 description.

- 2 -

Present on behalf of the appellant (opponent): Mrs Tonhardt, professional representative, identified by ID-Card, authorised by an authorisation dated 14 November 1997.

Present on behalf of the respondent (patentee): Mr Mayr, professional representative, identified by ID-Card, authorised by an authorisation dated 25 September 1995, accompanied by Mr Redding and Mr Koether.

The Chairman declared the oral proceedings open.

He summarised the relevant facts as appearing from the file.

The representatives addressed the Board.

The matter was then discussed with the representatives.

The appellant (opponent) requested that the decision under appeal be set aside and that the European patent No. 313 768 be revoked.

The respondent (patentee) requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request - claims 1 to 9 - or on the basis of the auxiliary request - claims 1 to 9 -, all claims filed during the oral proceedings.

The Chairman then adjourned the oral proceedings.

- 3 -

After deliberation by the Board the Chairman gave the following decision:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in the following version:

Claims: 1 to 9 of the main request as filed during the oral proceedings;

Description: claims 1 to 9 as well as 12 as filed during the oral proceedings;

Drawings: 1 to 10 as granted.

He then closed the oral proceedings.

The Minute Writer:

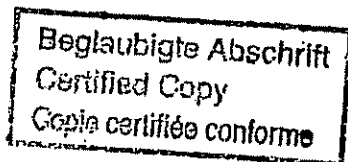
The Chairman:

Geschäftsstelle
Registry/Greff
1 1. NOV. 1997
Munich

M. Lewenton

C. Andries

EXHIBIT T



Europäisches
Patentamt

European
Patent Office

Office européen
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 1009/95 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 7 November 1997

Appellant:
(Opponent) Firma Rational GmbH
 Iglinger Strasse 62
 86899 Landsberg/Lech (DE)

Representative: Goddar, Heinz J., Dr.
 Forrester & Boehmert
 Franz-Joseph-Strasse 38
 80801 München (DE)

Respondent: Food Automation-Service Techniques, Inc.
(Proprietor of the patent) a corporation of the State of Delaware
 905 Honeyspot Road
 Stratford
 Connecticut 06497 (US)

Representative: Mayr, Claus-Michael, Dr. rer.nat.
 Patentanwälte Beetz & Partner
 Steinsdorfstrasse 10
 80538 München (DE)

Decision under appeal: Interlocutory decision of the Opposition Division
 of the European Patent Office posted 24 November
 1995 concerning maintenance of European patent
 No. 0 313 768 in amended form.

Composition of the Board:

Chairman: C. A. J. Andries
Members: R. E. Gryc
 M. Lewenton

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal, received at the EPO on 20 December 1995, against the interlocutory decision of the Opposition Division, dispatched on 24 November 1995, which maintained the patent No. 0 313 768 in an amended form on the basis of two independent claims 1 and 6.

The appeal fee was paid simultaneously and the statement setting out the grounds of appeal was received at the EPO on 22 March 1996.

- II. Opposition was filed against the patent as a whole and based on Article 100(a)EPC. The Opposition Division held that the grounds for opposition cited in Article 100(a)EPC did not prejudice the maintenance of the patent in an amended version, in particular having regard to the following documents:

E2: US-A-4 601 004

E6: Prospectus "Allround-System; Allround-System Rondair®" of 1983 of the firm H. Maurer+Söhne, Rauch-und Wärmetechnik GmbH & Co. KG (AS 0583/2D) and

E7: Prospectus of the firm H. Maurer+Söhne, Rauch-und Wärmetechnik GmbH & Co. KG entitled "Maurer-MC: Individuell Programmierbare Computersteuerungen" (05/83/D).

III. In his statement setting out the grounds of appeal, the appellant contended that an oven computer controlled system of the kind described in the precharacterising portions of independent claims 1 and 6 was already known before the priority date from prospectuses E6 and E7 published in 1983.

E7 providing further information on the computer control system disclosed in E6, the appellant was of the opinion that the two prospectuses should be considered as a single document E6/E7.

The appellant alleged that the features of paragraph (a) in the characterising portion of Claim 1 were also known in combination from E6/E7.

Moreover, he took the view that a combination of the rest of the characteristics described in paragraph (b) of Claim 1 was disclosed in E2 and that the skilled person would not feel hindered to apply the teaching of E2 to the system of E6/E7. Consequently, he considered that the subject-matter of Claim 1 was not inventive.

In relation with the subject-matter of Claim 6, the appellant pointed out that product selection keys were already known from E2. Nevertheless, he admitted that E2 did not teach to actuate twice the same product selection key.

He alleged also that, when seeking to optimise the cooking process, the skilled person would necessarily look for the most appropriate oven location for the given product and would automatize that search; in order to simplify the keyboard, he would also be inclined to keep the number of keys as low as possible

and therefore would be guided to use multifunctional keys. The person skilled in the art would thus arrive at the invention without an inventive step, just by combining the teaching of E2 with common general knowledge.

The appellant contended also that the range of application of the appliance known from E6/E7 covers the range of application of the device according to the invention and that the way to use the prepared meals after they have been cooked cannot influence the technology of the device disclosed in E6/E7. Also, none of the devices is limited to the size as disclosed in the prior art documents and variations in size do not change their technological content.

The appellant was also of the opinion that the disturbances which may occur during a cooking cycle do not influence the conception of the electronic system of the device. He also argued that everybody, not only skilled persons, knows that the parameters "temperature" and "duration of time interval" are usually linked together and that they are the most critical factors for cooking and that furthermore to use multifunctional keys was commonly used in the field of computers and typing machines.

Therefore, the appellant does not see any inventive step in the subject-matter of both independent claims 1 and 6.

- IV. The respondent (proprietor of the patent) counterargued that the system of E6 is intended for use in industrial cooking establishments and designed to be undisturbed after a cooking cycle is programmed and activated. He contended that E2 does not even suggest a programmed means for varying the duration of each of a plurality of time intervals, let alone varying the duration of an

interval in accordance with a predetermined cooking curve. According to the respondent, E2 did not even suggest that such a time variation could be desirable in a device other than a fryer.

The respondent also pointed out that none of the cited references even suggested that product selection keys could possess two functions i.e. one for establishing cooking parameters for a particular product and one for indicating the oven location of the product and that indicating oven locations could be even desirable.

V. Oral proceedings took place on 7 November 1997

The respondent filed two new requests i.e. a main request comprising in particular an amended description and two modified independent claims 1 and 6 and an auxiliary request which differs from the main request only in that Claim 6 is made dependent of the preceding claims.

No objection against the respondent's new submissions was made by the appellant with regard to the requirements of Article 123 EPC.

The respondent explained that the system as claimed in Claim 1 is designed for commercial kitchen environments in which ovens are subject to frequent disturbances and that, according to the invention, in order to keep a uniform and optimal quality for the products despite these disturbances, a specific cooking time is attributed to each product, each cooking time is divided in several time intervals, in each of said intervals, one or more parameters are controlled with reference to their corresponding cooking curves, and the duration of any of said time intervals is varied in response to the measured temperature value.

The appellant however was of the opinion that E2 described the closest state of the art since it disclosed the technical concept of the invention in so far as it is limited to the temperature as parameter and to one time interval which is the cooking time. In his opinion, to consider more parameters and more intervals is only a software measure which did not involve an inventive step since the skilled person would determine easily which parameter should be taken into consideration.

The respondent counterargued that the system of E2 only monitored the temperature deviations, did not use algorithms, and disclosed therefore a passive monitoring without any closed loop control.

- VI. The appellant requested that the decision under appeal be set aside and the patent No. 0 313 768 be revoked.

The respondent requested that the decision under appeal be set aside and that the patent be maintained on the basis of one of the requests filed during the oral proceedings.

- VII. The wording of the independent claims 1 and 6 of the main request reads as follows:

Claim 1:

"A parameter control system in an oven for heating a food product, comprising means for controlling as a first parameter the temperature and as further parameters at least one of the volumetric flow rate (V), the humidity (H) and the circulation (R) of a heating medium, comprising:

- (a) parameter control algorithm means (10) for controlling parameters within each of a plurality of time intervals of a cooking cycle for the food product, each interval programmed for a predetermined value of each controlled parameter (50, 51, 52, 53), in which said algorithm means (10) receives data from parameter monitors to deliver command signals to corresponding parameter control devices to control each parameter to its corresponding predetermined value;
- (b) programmed means for varying the duration of any of said time intervals according to a predetermined cooking curve (Figure 6) in response to the measured value of at least said temperature and, if applicable, one of said further parameters."

Claim 6:

"A parameter control system in an oven for heating a food product, comprising means for controlling a first parameter of a heating medium, characterized by a plurality of product selection keys (11) which upon one actuation of a first key selects at least one heating parameter for a given product and which upon another actuation of the first key indicates an oven location for the given product."

Reasons for the Decision

1. Admissibility of the appeal

After examination the appeal has been found to be admissible.

2. Main request

2.1 Modifications (Article 123 EPC)

Independent claim 1 has been rewritten with respect to claim 1 as maintained by the first instance in order to incorporate more characteristics clarifying the relation "parameters-time intervals-cooking cycle". Each of the amendments has a support in the application as filed. New Claim 6 corresponds to Claim 4 as granted. The description has been amended accordingly. After examination, the modifications made before the Board have been found to comply with the requirements of Article 123 EPC and therefore to be admissible.

Since this has not been disputed by the Appellant during the oral proceedings, there is no need for further detailed substantiation.

2.2 Novelty of the subject-matter of claims 1 and 6 (Article 54 EPC)

After having examined the citations introduced in the course of the appeal proceedings, the Board is satisfied that none of them discloses a system comprising in combination all the features described respectively in independent Claims 1 or 6 as filed during the oral proceedings (main request).

Since this has also not been disputed by the Appellant, there is no need for further detailed substantiation and the subject-matter as set forth in said claims is to be considered as novel within the meaning of Article 54 EPC.

2.3 The closest state of the art:

E6 and E7 concern the same technical field and a type of oven for baking, steaming or roasting a product as the one according to the invention. They describe also, in such an oven, a computer controlled system comprising means for controlling the temperature, the volumetric flow rate, the humidity and the circulation of the heating medium used for heating each specific food product. Therefore, the Board considers that due to the general wording of claim 1 the state of the art closest to the invention is disclosed in E6 and E7 considered as forming a single disclosure E6/E7.

Documents E6/E7 however are not unequivocally clear with respect to the control systems used, i.e. open loop control system (Steuerung) or closed loop control system (Regelung).

The subject-matter of Claim 1 therefore differs from said closest state of the art at least in that, the cooking cycle of each food product being divided in a plurality of time intervals and each interval being programmed for a predetermined value of each controlled parameter, parameter control algorithm means controlling each cooking parameter to its corresponding predetermined value within each of said intervals, i.e. during the complete cooking cycle, and in that it

comprises programmed means for varying the duration of any of said time intervals according to a predetermined cooking curve in response to the measured value of at least the temperature and, if applicable, one of the other parameters.

The subject-matter of Claim 6 differs from said closest state of the art in that the product selection keys are such that upon successive actuations of one and the same key, said key successively selects at least one cooking parameter and then indicates an oven location for the given product.

2.4 Problems and solutions

In view of the aforementioned closest state of the art, the problem to be solved as regards to Claim 1 appears to be to improve the control system of E6/E7 for precisely controlling the cooking parameters in the oven with said parameters being easily and repeatably set (see the description filed at the oral proceedings: column 2, lines 3 to 5 and 21 to 28).

To provide the system of E6/E7 with algorithm means for closed-loop controlling cooking parameters within each of a plurality of time intervals of the cooking cycle and with programmed means for varying the duration of any of said time intervals as claimed in claim 1 appears to bring an effective solution to the objective determined problem.

With regard to Claim 6, the problem appears to be to optimise the use of the oven. By providing keys having two functions, one of these being to indicate the most appropriate location for the given product, this problem appears to be solved effectively.

2.5 Inventive step (Article 56 EPC)

2.5.1 The questions to be answered as regards the inventive step are not only whether the skilled person examining the prior art in the light of his general common knowledge would be provided with enough indications so that he could arrive at the solution claimed in Claim 1, but moreover whether, starting from the control system disclosed in E6/E7, he would be incited by a particular teaching, a hint, or clue of the prior art to modify such a system in the direction of the invention in expectation of the improvement he was searching (see Decision T 2/83, OJ EPO 1984, 265).

2.5.2 Prospectuses E6/E7 describe an oven installation for use in industrial cooking plants (see E6: page 2, left hand column and all the photos of the prospectus) comprising a computer control system for heating food products (see E6: page 8, left hand column and E7).

From these prospectuses, the skilled person learns that, with the system as disclosed, parameters such as cooking time, temperature and humidity during the cooking cycle are to be preprogrammed and that the oven installation shows permanently the actual values of said parameters (see E6: page 9, end of the central column; and E7: page 3, last paragraph of the left hand column). The required functions such as heating, cooling, damping, air circulation etc... are completely preprogrammed and are called manually by pressing a key (see E7: page 2, paragraph 4), the operator having always the possibility of intervening easily in the programs in progress (see E6: page 9, central column, third last paragraph and E7: page 2, paragraph 6).

It appears from the description given by these prospectuses that, with this system, the parameters are preprogrammed before the start of the cooking cycle and that, during the cycle, they are only monitored and not closed-loop controlled since E6/E7 do not describe clearly either explicitly or implicitly that algorithm means are provided, which deliver command signals to corresponding parameter control devices to adjust each parameter to its corresponding predetermined value, said adjustment appearing to be done manually by pressing a key to call the required function (see above).

Moreover these documents do not clearly teach to divide the cooking cycle in a plurality of time intervals in the meaning of the present invention, let alone to program each interval for a predetermined value of each parameter and to provide means for varying the duration of any of said intervals according to a predetermined cooking curve in response to the measured value of the temperature and of any other parameter.

- 2.5.3 Document E2 relates to a microcomputer controlled cooking timer for use, in particular, in conjunction with a deep fat frying operation i.e. in a technical field which is not exactly the same as according to the invention which concerns ovens and more particularly combi-ovens.

According to this known control system, the microcomputer monitors the temperature of the cooking medium (frying oil) and compensates the preset cooking time in accordance with the preset time versus temperature curve to give the desired cooking cycle (see E2: Column 1, lines 13 to 18; column 2, lines 40 to 48; column 9, lines 48 to 53 and column 10, lines 56 to 61).

Therefore, the system of E2 comprises means for monitoring and for an open loop control of the temperature but has no means for closed loop controlling of the temperature. Indeed, in document E2 no disclosure either explicitly, or implicitly could be found, where the preset temperature (see Figures 2 and 3C: 176) is directly compared with the sensed actual temperature of the cooking medium (see Figures 2 and 3C: 120). That means that no closed loop control is available for a closed loop temperature control. Furthermore, the cooking cycle itself constitutes only one "time interval", the duration of which is varied according to a predetermined cooking curve in response to the measured value of the temperature.

In the system of E2, only the cooking time of the whole cooking cycle is controlled and there is no means for closed loop controlling the temperature or another parameter of the heating medium, let alone means for closed loop controlling parameters within each of a plurality of time intervals of the cooking cycle.

- 2.5.4 The skilled person wishing to improve the control system described in E6/E7 for precisely controlling a plurality of cooking parameters in an oven, with said parameters being easily and repeatably set (see above in section 2.4, the problem as regards to Claim 1), has a priori no reason to consult a prior art document such as E2 which relates to a fryer, the cooking process of which depends apart from the cooking time of only one parameter (i.e. the temperature of the frying oil). Even if he would consult E2, the skilled person will find neither a clear indication nor a hint to solve the above-mentioned problem since the only parameter considered in E2 (apart the cooking time) is not closed loop controlled. Moreover, he will not even have the possibility of interpreting the teaching of E2 as influenced by the problem solved by the invention since

this problem is neither mentioned nor even suggested in this document, such an approach being considered merely as the result of an ex-post facto analysis which has to be avoided (see decision T 05/81, OJ EPO 1982, 249).

Furthermore, the E6/E7 devices do not need an adaptation as suggested in E2, since in E6/E7 a procedure of opening the oven door during the cooking cycle or during a time interval of that cooking cycle is not disclosed at all, either explicitly, or implicitly. On the contrary, the information given in E6/E7 rather suggests a cooking procedure with closed doors.

2.5.5 With regard to the subject-matter of Claim 6 and its related problem, the skilled person would also find neither in E6/E7 nor in E2 any indication or hint about keys having several functions, let alone about keys which upon one actuation can select one parameter and upon another actuation indicates a location for the food product.

2.5.6 For the foregoing reasons, the Board considered that to improve the parameter control system for an oven disclosed in E6/E7 according to the teachings of Claim 1 and Claim 6 does not follow plainly and logically from the cited prior art and that the reasons brought forward by the appellant did not prejudice the maintenance of the patent in the amended version of the respondent's main request filed at the oral proceedings.

2.5.7 Starting from a device according to E2 as closest prior art, also cannot lead in an obvious way to the claimed system since E2 clearly relates to a deep fat frying operation, wherein only temperature and time are important, and wherein the cooking cycle can only be considered as one "time interval". Therefore obvious

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T 1009/95

modification of such a system could only result in an improved systems still relating to deep fat frying operations.

3. Auxiliary request

Since the board has acknowledged the main request as allowable, there is no need to consider the respondent's auxiliary request.

Order

For these reasons it is decided that:

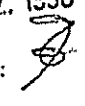
1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in the following version:

claims: 1 to 9 of the main request as filed during the oral proceedings;

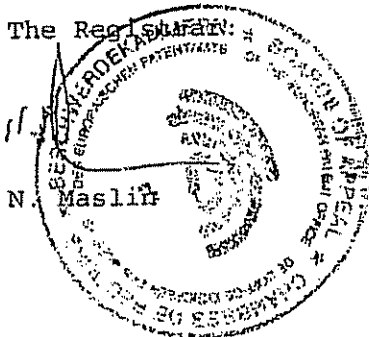
description: columns 1 to 9 as well as page 1a as filed during the oral proceedings;

drawings: 1 to 10 as granted.

Geschäftsstelle
Registry/Greife
Begezeugt/Certified
Certifié conforme
München/Munich
- 5. MRZ. 1998

The Chairman: 

C. Andries



0258-D

R G Le

EXHIBIT U

Food Automation - Service Techniques, Inc.
905 HoneySpot Road • Stratford, CT 06497
800-327-8766 • Fax: 203-377-8187
Contact: Bill McClain for more information



Easy and Consistent ... (FAST.)® Control Technology!

PRESS RELEASE

FOR IMMEDIATE RELEASE
November 12, 1997

FAST EUROPEAN COMBI OVEN PATENT UPHELD **Rational GmbH's Opposition Proceeding Rejected** **by European Patent Office**

Stratford, CT, USA. - Food Automation - Service Techniques, Inc., (FAST), announced today that on November 7, 1997, the Appeal Board of the European Patent Office rejected Rational GmbH's Opposition and upheld FAST's European Patent No. 0313768.

The '768 patent describes an oven control system which allows relatively unskilled labor to perform complicated working tasks automatically. Typical applications for this technology are combi ovens, rotisserie ovens, bakery ovens, proofer retarders, and convection ovens. The rejection of the Opposition results in FAST maintaining patent protection for the invention of the '768 patent in the member countries of the European Community.

Recently, FAST successfully settled its infringement action on its companion Patent No. 4,920,948 in the US against United Electric Controls Company. Major points in the Federal Court judgement against United Electric include validation of FAST's patent and admission by UE that it infringed. The terms of the settlement were that UE agreed to withdraw from the electronic controller business and pay FAST an undisclosed sum in compensation.

"Reconfirming our European Patent now solidifies our worldwide technology leadership and strengthens our patent portfolio on FAST's innovative technology", said Bernard G. Koether, FAST's Chairman.

-- more --

FAST/ADD ONE
November 12, 1997

"FAST has invested a considerable amount of time and resources in the development of electronic technology for the foodservice industry. Recognition of our intellectual property rights both in hardware and software is significant," said Mario Ceste, VP of Business Development for FAST. "FAST will continue to protect its intellectual property, while granting licenses that are advantageous for the industry and our customers. We encourage companies to contact FAST for friendly licensing discussion at this time."

For more than 25 years, FAST has designed and engineered equipment controls for the foodservice industry that are easy to use and produce premium food quality. FAST's innovative technology, the patented SMART COMMERCIAL KITCHEN® (SCK®), has been developed and tested over the past decade, and is the most advanced, energy efficient, and labor-reducing foodservice environment available today.

For more information about FAST products, please contact Bill McClain at 1-800-FAS-TRON (1-800-327-8766) ext. 525, or visit the FAST website on the internet at www.fastinc.com. For information about FAST technology licensing, contact Mario Ceste at 1-800-FASTRON (1-800-327-8766) ext. 297.

###

EXHIBIT V

SETTLEMENT AGREEMENT

This agreement (the "Agreement") is made, entered into and effective this 10th day of September, 1997 by and between Food Automation-Service Techniques, Inc., a Delaware corporation having a principal place of business at 905 Honeyspot Road, Stratford, Connecticut 06497 (hereinafter referred to as "FAST") and United Electric Controls Company, a Massachusetts corporation having a principal place of business at 180 Dexter Avenue, Watertown, Massachusetts 02272 (hereinafter referred to as "UEC").

WHEREAS, FAST is the exclusive licensee, with the right to initiate and maintain suits for infringement of United States Letters Patent No. 4,920,948 (hereinafter referred to as the "'948 Patent") entitled "Parameter Control System For An Oven" and assigned to Technology Licensing Corporation ("TLC");

WHEREAS, FAST has filed suit against UEC in the United States District Court for the District of Massachusetts, Civil Action No. 95-12663-RCL asserting that UEC has infringed the '948 patent (hereinafter referred to as the "Lawsuit");

WHEREAS, FAST and UEC desire to compromise and settle all matters raised in the Lawsuit to avoid further expenditure of time and money relating to further litigation; and

WHEREAS, FAST and UEC being duly represented by counsel have freely entered into this settlement agreement.

NOW, THEREFORE, in consideration of the mutual undertakings and promises set forth herein, the sufficiency of which is acknowledged, it is agreed and understood as follows:

1. Simultaneously with the execution of this Agreement:

a. FAST and UEC will execute and deliver a Consent Judgment in the form annexed hereto as Exhibit A and thereafter submit it to the Court in the Lawsuit;

b. FAST and UEC will execute and deliver the Technology Asset Transfer Agreement annexed hereto as Exhibit B.

c. FAST will execute the covenant not to sue Athena Controls, Inc. in the form annexed hereto as Exhibit C.

d. Robert Reis, a former shareholder, director and/or officer of UEC will execute and deliver a Non-competition Agreement in the form annexed as Exhibit D.

In the event additional documents are necessary to effect this Settlement, FAST and UEC agree to execute and submit such additional documents as required.

2. Upon entry of the Consent Judgment by the Court, UEC shall transfer to Pennie & Edmonds LLP (attn: Rory J. Radding, Esq.) all documents and physical materials including UEC attorney work product and attorney-client privileged documents relating to UEC's defenses therein except documents which relate only to the conduct of the litigation, or which are totally unrelated to the '948 patent or which contain nothing that relates to the substance of UEC's patent defenses or which solely relate to the negotiations and agreement between UEC and Athena Controls, Inc., and UEC shall provide a declaration in the form annexed hereto as Exhibit E that neither UEC nor its attorneys have retained any such documents or copies thereof in any form. Such declaration upon execution and delivery to FAST or its attorneys shall be deemed incorporated by reference into the terms and conditions of this Settlement Agreement.

3. As further consideration for this settlement, UEC agrees to pay FAST the aggregate sum of \$700,000 payable as follows:

- a. \$250,000 paid by wire transfer into and received in FAST's bank account in Fleet Bank, ABA 011500010, FBO Food Automation-Services Techniques, Inc., Acct. No. 00049182 on or before Friday, September 12, 1997; and
- b. an additional \$450,000 paid by wire transfer into and received in TLC's bank account in Fleet Bank, ABA 011900571, FBO Technology Licensing Corporation, Acct. No. 940-173-3214 on or before September 12, 1997.

4. UEC recognizes that it is no longer going to be in the business of manufacturing, using, offering for sale, and selling products that are substantially similar to the electronic controllers for food preparation made and sold by UEC (the "Business"). A product shall be deemed to be substantially similar to such controllers if it (i) is designed to be installed on equipment used for cooking food for human consumption, and (ii) utilizes electronic rather than electro-mechanical technology. UEC's temperature sensors, pressure switches, temperature switches (thermostats), thermowells, Sizzle Presses, and the Arc Watch technology, and future embodiments thereof, shall not be deemed to be substantially similar to any of such controllers. The recognition by UEC that it is no longer going to be in the Business is in part a principal inducement to FAST to settle the lawsuit. UEC represents, warrants and covenants that neither UEC nor any persons in privity therewith including its current officers, current directors (except directors who are attorneys employed by the law firm of Deutsch, Williams, Brooks, DeRensis, Holland and Drachman, P.C. to the extent that they are performing legal services), voting shareholders, executors thereof, administrators thereof, successors and assigns as well as former Shareholder Robert Reis, will nor intend to, re-enter the Business during the term of the '948

Patent. There are no current employees of UEC in a managerial, supervisory or engineering capacity who were directly involved in the Business except those involved in the finance part of the Business, draftsmen and certain employees who may have assembled certain components of the controllers. There are no nonvoting shareholders of UEC who were directly and actively involved in the Business except Bill Reis III who is not currently involved in the Business. Paul DeRensis, presently a director of UEC and a name partner in the law firm of Deutsch, Williams, Brooks, DeRensis, Holland, and Drachman, P.C. warrants that he is not aware of any existing client or prospective client of the firm that is currently engaged or contemplating to be engaged in the business of making or selling controllers which are used for the electronic control of food preparation and which are to be sold in competition with FAST.

5. FAST and TLC represent, warrant, and covenant that the '948 patent is properly assigned to TLC and properly exclusively licensed to FAST, that FAST has full authority to settle a claim for infringement of the '948 Patent on behalf of TLC, that payments made to TLC are in full satisfaction of settlement of the lawsuit, that is, infringement of the '948 patent by UEC, and of UEC's obligations under the Settlement Agreement, and that no other parties have any interest in the '948 Patent.

6. This Agreement shall be binding upon and inure to the benefit of the parties hereto, including their respective directors, officers, voting shareholders, heirs, executors, administrators, assigns and successors in interest and at law.

7. This Agreement is intended by the parties, and each of them, as a complete and exclusive statement of the arrangements between the parties with respect to the matters contemplated hereby to settle fully and compromise the Lawsuit hereinbefore mentioned and

cannot be changed or terminated orally and merges all prior understandings, representations and undertakings between the parties.

8. If any section, paragraph or subparagraph of this Agreement or any portion thereof is held to be indefinite, invalid, illegal or otherwise void, voidable or unenforceable by a court of competent jurisdiction from which no appeal can be taken, such provision shall be curtailed and limited to the extent necessary to bring it within the requirements of the law, and the Agreement shall remain valid and enforceable, and the parties shall be bound by and perform this Agreement as thus modified.

9. If either party breaches any provision of this Agreement, the nonbreaching party shall be entitled to recover from the breaching party all damages, costs, and expenses, including attorneys' fees, which may be reasonably incurred to remedy the breach.

10. The parties agree that any controversy, dispute, question or claim arising out of or in connection with or relating to this Agreement shall be governed by and construed under the laws of the State of Delaware. The parties agree that the United States District Court for the District of Massachusetts retains jurisdiction over the parties, the subject matter of the Lawsuit and this Settlement Agreement. Any dispute arising out of this Agreement shall be referred to Magistrate Judge Zachary Karol or, in the event Magistrate Judge Zachary Karol is unavailable, another judge with authority to mediate disputes within the United States District Court for the District of Massachusetts.

11. This Agreement may be executed in two counterparts, each of which shall be deemed to be one and the same instrument.

NOW, THEREFORE, the parties have executed this Agreement on the date first written above.

FOOD AUTOMATION-SERVICE TECHNIQUES, INC.

By: B. G. Keefe

Title: Chairman

UNITED ELECTRIC CONTROLS COMPANY

By: D. A. Reid

Title: President

TECHNOLOGY LICENSING CORPORATION

By: B. G. Keefe

Title: Chairman

EXHIBIT A

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

FOOD AUTOMATION - SERVICE
TECHNIQUES, INC.

Plaintiff,

v.

UNITED ELECTRIC CONTROLS
COMPANY

Defendant.

Civil Action No:
95-12663-RCL

CONSENT JUDGMENT

The parties hereto, plaintiff Food Automation-Service Techniques, Inc. ("FAST") and defendant United Electric Controls Company ("defendant UEC"), have resolved their differences in accordance with a settlement agreement executed by them and have consented to the entry of the following judgment:

IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. This court has and retains jurisdiction over the parties and the subject matter of this action and to enforce this Consent Judgment and any and all disputes arising thereunder.

2. FAST is the exclusive licensee with the right to initiate and maintain suits for infringement of United States Letters Patent No. 4,920,948 ("the '948 patent") which is valid and enforceable in all respects.

3. Defendant UEC understands the invention described in claims of the '948 patent.

4. Defendant UEC has submitted in this action all the evidence known and available to defendant relating to the validity and enforceability of the '948 patent and admits

and consents to the validity and enforceability of the '948 patent in full light of said evidence and admits, agrees and consents to the validity and enforceability of the '948 patent, for all purposes, regardless of forum, and irrespective of the claims, causes of action or items at issue including, without limitation, the instant lawsuit, future litigation and other proceedings.

5. Defendant UEC has infringed the claims of the '948 patent by making, using, offering for sale and selling controllers for food preparation within the scope of the claims of the '948 patent including, without limitation, certain models designated as Y6000 series.

6. Judgment on the basis of infringement of United States Letters Patent No. 4,920,948 is entered in favor of plaintiff.

7. Defendant UEC, its current officers, current directors (except directors who are attorneys employed by the law firm of Deutsch, Williams, Brooks, DeRensis, Holland and Drachman, P.C. to the extent that they are performing legal services), voting shareholders, successors, all persons in privity and all persons in active concert or participation with it, are, during the term of the '948 patent, hereby permanently enjoined and restrained from infringing the claims of the '948 patent. It shall be conclusively presumed that any of the parties or persons enjoined and restrained violate the Consent Judgment and cause plaintiff irreparable harm, if that party or person resumes making, offering for sale and selling electronic controllers for food preparation, except UEC's temperature sensors, pressure switches, temperature switches (thermostat), thermowells, Sizzle Pressure, Arc Watches technology and future embodiments thereof. In such event, such person or party resuming such activities shall be deemed to be in contempt of this Court's Consent Judgment and shall, at a minimum, pay plaintiff's attorneys fees incurred by the plaintiff in pursuing such contempt up to \$150,000 and pay plaintiff \$250,000. Plaintiff reserves the right to seek further relief for the contempt from the Court as may be appropriate.

8. Defendant UEC's counterclaims are dismissed with prejudice.

9. The parties shall bear their own costs.

10. This Consent Judgment is binding upon the parties and constitutes *res judicata* and collateral estoppel.

11. The parties waive all rights to appeal from this judgment.

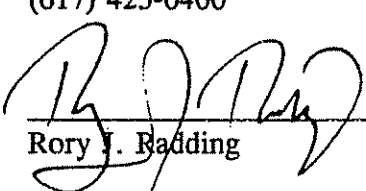
Dated: September 12, 1997

FOOD AUTOMATION - SERVICE
TECHNIQUES, INC.

By its attorneys,

James Coyne King
BBO No. 272620

HANIFY & KING
Professional Corporation
One Federal Street
Boston, Massachusetts 02110
(617) 423-0400



Rory J. Radding

PENNIE & EDMONDS LLP
1155 Avenue of the Americas
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(212) 790-9090

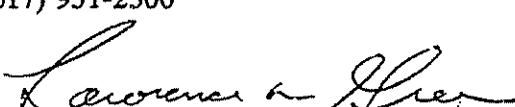
UNITED ELECTRIC CONTROLS
COMPANY

By its attorneys,



John Foskett
BBO No. 175540

DEUTSCH WILLIAMS BROOKS
DeRENSIS HOLLAND & DRACHMAN, P.C.
99 Summer Street
Boston, MA 02110-1235
(617) 951-2300



Lawrence M. Green
BBO No. 209080

WOLF GREENFIELD & SACKS, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02110
(617) 720-3500

SO ORDERED:

District Court Judge

Dated: _____

EXHIBIT B

TECHNOLOGY ASSET TRANSFER AGREEMENT

AGREEMENT made, entered into and effective this 10th day of September, 1997 by and between Food Automation-Service Techniques, Inc., a Delaware corporation with an office and place of business at 905 Honeyspot Road, Stratford, Connecticut 06497 (hereinafter referred to as "FAST") and United Electric Controls Company, a Massachusetts corporation having a principal place of business at 180 Dexter Avenue, Watertown, Massachusetts 02272 (hereinafter referred to as "UEC").

WHEREAS, UEC is no longer going to be, nor intends to continue, in the business of manufacturing, selling or offering for sale certain products as set forth in Paragraph 6 herein;

WHEREAS, UEC owns or has the right to use certain technology relating to the electronic control of food preparation and has agreed to transfer all right, title and interest to such technology to FAST as partial consideration for settlement of Civil Action No. 95-12663-RCL currently pending in the United States District Court for the District of Massachusetts ("the Lawsuit"); and

WHEREAS, FAST has agreed to receive the transfer of such technology as partial consideration for settlement of the lawsuit;

NOW, THEREFORE, IT IS AGREED AND UNDERSTOOD as follows:

1. **TRANSFER OF UEC TECHNOLOGY**

a. The parties agree that the transfer by UEC of the technology listed in Schedule 1 ("Technology Assets") to FAST is intended to fully enable FAST to manufacture and sell controls in accordance with that technology ("Controls"). Such Technology Assets shall include, without limitation, inventions, know-how, trade secrets, manufacturing, marketing and sales information and intellectual property relating to the electronic control of food preparation

in the possession, custody, or control of UEC, including the technology identified in Schedule 6.02 in the Asset Sale Agreement between Athena Controls, Inc. and United Electric Controls dated August 15, 1996.

b. All such Technology Assets shall be transferred unencumbered by UEC, by any financial organization and/or by Athena Controls, Inc., and shall include, where the extent of rights owned and/or held by UEC permit, exclusive unrestricted rights to the technology (including intellectual property) received from Cooking Automation Systems (CAS), Louis Pollster, and any other technology (including patents and trade secrets) covering technology capable of the electronic control of food preparation. Concerning the CAS technology, such rights shall be transferred pursuant to a sub-license in accordance with paragraph 1.1 of the Agreement for the Purchase and Sale of Assets and License of Technology between Cooking Automation Systems, *et al.* and UEC dated July 1986 which sub-license is attached as Exhibit 1 hereto. UEC represents it is not retaining any technology relating to the electronic control of food preparation.

c. The Technology Assets transferred include, without limitation, to the extent they are in the possession, custody, or control of UEC, all assembly drawings, manufacturing procedures, quality control tests, engineering notebooks, bills of material, manufacturing assembly aids, drawings, schematics and diagrams, software documentation and software source files. UEC represents, warrants and covenants that it no longer has any parts, inventory or controller systems related to the Technology Assets.

d. The Technology Assets shall constitute all of the assets and property, to the extent they are in the possession, custody, or control of UEC, necessary for the conduct of UEC's remaining business relating to the electronic control of food preparation in the manner and to the extent conducted to enable FAST to continue the operation of such UEC business.

e. FAST shall not assume any liabilities or obligations of UEC and nothing herein shall be construed as imposing any liability or obligation upon FAST other than those specifically provided for herein.

2. REPRESENTATIONS AND WARRANTIES OF UEC

a. UEC is a corporation duly organized, validly existing and in good standing under the laws of the Commonwealth of Massachusetts.

b. UEC has full corporate power and authority to enter into and perform this Agreement and to transfer to and vest in FAST all right, title and interest to the Technology Assets, as provided herein.

c. To the best of UEC's knowledge and belief, UEC warrants that at no time has it operated in material breach of any statutory requirement, by-law or regulation, and that all permits, licenses and similar authorizations required by any government agency in the United States are in full force and effect.

d. To the best of UEC's knowledge and belief, UEC owns, is licensed or otherwise has the full right to use and has good and marketable title to all Technology Assets free and clear of all liens including, without limitation, all patents, trademarks and copyrights used in UEC's electronic controller business for food preparation. Schedule 1 hereto contains a complete and accurate list of all Technology Assets including (i) all patents, trademarks, copyrights, technology and know-how used or proposed to be used by UEC in connection with the manufacture and sale of electronic control devices for the control of food preparation (except (a) those assets conveyed to Athena Controls, Inc., (b) the arc watch technology, (c) the name United Electric Controls and variants thereof and (d) the Sizzle Press), all applications therefor and all licenses and other agreements relating thereto, and (ii) all agreements relating to

technology and know-how that UEC is licensed or authorized to use by others or licenses or authorizes others to use. To the best of UEC's knowledge and belief, UEC has the sole and exclusive rights to its patents, trademarks, copyrights, technology, and know-how identified in Schedule 1 hereto, and no consent of any third party is required to transfer the rights therein to FAST. UEC represents and warrants that it has no knowledge of any patents, trademarks, copyrights, technology or know-how which would prevent the use of these rights by FAST except for rights owned by Athena Controls, Inc.

e. UEC has fully disclosed or will disclose to FAST on or before September 12, 1997, all Technology Assets set forth in Schedule 1 including, without limitation, inventions, methods, plans, drawings, and know-how known to it or in its possession and usable by FAST in connection with its business as now conducted or proposed to be conducted.

f. To the best of UEC's knowledge and belief, the Technology Assets set forth in Schedule 1 constitute all of the assets and property in UEC's possession, custody or control required for the design, manufacture and sale of electronic controllers for food preparation and upon transfer to FAST should enable FAST to continue the manufacture and sale of such Controls as an ongoing business in a manner consistent with UEC's past practices. UEC also warrants to the best of its knowledge that all files, drawings, and records included in the Technology Assets are true and accurate in all material respects. There is excepted from the foregoing, (i) the names United, United Electric Controls, UEC and all variants thereof and (ii) the rights in and to the Arc Watch technology, and (iii) the rights in and to the Sizzle Press.

g. UEC has complied with and will continue to comply with all terms and conditions as required of it by the Agreement for the Purchase and Sale of Assets and License of Technology between Cooking Automation System *et al.* and UEC dated July 1986 including,

without limitation, the payment of all maintenance and other fees to maintain patents in full force and effect, except as noted in Exhibit 2 attached hereto.

h. The transactions contemplated in the making and performance of this Agreement will not result in any breach of, or constitute default under, any indenture, mortgage, deed of trust, agreement, security agreement, corporate charter, bylaw or any other instrument to which UEC is a party or by which UEC may be bound in any way in any material manner. UEC also warrants that there are, without exception, no business contracts or agreements of any kind of a nature or duration which adversely affect in a material way the value of the Technology Assets subject to this Agreement.

i. There are no undisclosed contracts, leases, or commitments of any nature now outstanding or in effect except contracts made in the ordinary course of business.

j. There is no litigation, or other proceeding of any kind, whether administrative or civil, in any state or Federal court, pending, or to the knowledge of UEC threatened against UEC related to the Technology Assets, nor does UEC know or have any reasonable grounds to know of any basis for such action of any governmental investigation relative to UEC, its property or business.

3. REPRESENTATIONS AND WARRANTIES OF FAST

a. FAST is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware.

b. FAST has full corporate power and authority to enter into and perform this Agreement and to acquire the Technology Assets.

c. FAST has not entered into any contract that will interfere with FAST's ability to consummate this transaction as contemplated herein.

d. There is no litigation, proceeding or governmental investigation pending or, so far as is known to FAST, threatened against or relating to FAST or FAST's business or the transaction contemplated by this Agreement, nor is there any basis known to FAST for such action.

4. PRODUCT LIABILITY

a. UEC agrees that it is financially responsible for all warranty costs for controls sold by it up to the time of transfer to FAST. FAST may perform all warranty repairs on, or replace, such controls after the transfer, including without limitation, repairs on or replacement of controls sold by UEC prior to the transfer and UEC shall reimburse FAST \$50 per such repaired or replaced controller.

b. UEC agrees that it is responsible for any claims or liabilities of any kind relating to the sale of controls by UEC prior to transfer, including product liability. UEC shall indemnify and hold FAST harmless from any losses arising from product liability claims which are presently pending or which may arise and be asserted against the Technology Assets based upon UEC's use of the Technology Assets or sale of Controls made therefrom prior to transfer. FAST agrees to notify UEC of any claim (other than warranty claims arising in the ordinary course of business which shall be governed by the provisions of Section a. hereof) as soon as practicable after receipt of notice of the assertion or commencement of any claim, action or proceeding for which indemnification may be sought which notice shall state the facts giving rise to the claim and, if ascertainable, the amount of the liability asserted by reason of the claim. Upon receipt of such notice, UEC and its insurer shall be entitled, if they so elect, to participate in the action and, to the extent that they shall elect, to assume the defense of the action. After notice from UEC or its insurer to FAST of its election so to assume the defense of the action,

UEC shall control the defense of the action and may compromise or settle such action and shall not be further liable to FAST for any fees or other counsel or any other expenses. If notice is given to UEC of the commencement of any action and it does not within thirty (30) days after receipt of FAST's notice give notice to FAST of its election to assume the defense of the action, FAST shall control the defense and may compromise or settle such action and UEC shall be bound by any determination made in such action or any compromise or settlement of the action effected by FAST provided, however, that such claim is subject to indemnification pursuant to the terms of this Agreement. The parties shall cooperate with each other in the defense of any claim.

5. ADDITIONAL AGREEMENTS OF THE PARTIES

a. UEC hereby agrees to indemnify FAST from any losses, damages, costs, judgments or expenses, including reasonable attorney's fees, of any kind arising out of UEC's (a) breach of any of the representations and warranties of UEC's made in this Agreement; and (b) the failure of UEC to perform any covenant set forth in this Agreement. UEC further indemnifies and holds FAST harmless from any losses, damages, costs, judgments or expenses, including reasonable attorney's fees, arising from any successful patent, trademark, or copyright infringement claims made by others including, without limitation, specifically claims by Athena, its successors or assigns, for infringement of United States Patent No. 5,179,265, with respect to the manufacture or sale by FAST of controls made in accordance with the Technology Assets, except to the extent that such claims arise in whole or in part from additions, changes or improvements to the Technology Assets by FAST unless the controls which are the subject of the claims would have constituted an infringement in the absence of any such additions, changes or improvements by FAST. UEC's total liability for attorneys' fees and damages for any such

claims shall be capped at \$500,000. UEC shall not be required to reimburse FAST for any liability resulting from patent infringement which arose after FAST became aware of the existence of a patent which formed the basis for a claim of patent infringement by others except any liability to Athena under U.S. Patent No. 5,179,265. FAST warrants that it has no knowledge or awareness of any basis of a claim of patent infringement by a third party related to the Technology Assets. Any and all rights to indemnification provided in this paragraph shall be limited to infringement suits commenced within six years of the date of execution of this agreement and shall not apply to any claim for which FAST has insurance coverage.

b. FAST hereby agrees to indemnify UEC from any losses, damages, costs, judgments or expenses, including reasonable attorney's fees, or any kind arising out of FAST's (a) breach of any of the representations and warranties of FAST made in this Agreement; and (b) the failure of FAST to perform any covenant set forth in this Agreement.

6. NON-COMPETITION

a. The parties agree that the consideration was fixed on the basis that the transfer of the Technology Assets to FAST would provide FAST with the full benefit and good will of UEC as it existed on the Effective Date. UEC acknowledges that it is proper for FAST to have assurance that the value of the Technology Assets will not be diminished by acts of UEC after the Effective Date. The recognition by UEC that it is no longer going to be in the business of manufacturing, using, selling or offering for sale electronic controls for food preparation that are substantially similar to the Technology Assets (the "Business") is, in part, a principal inducement to FAST for entering into this Agreement. A product shall be deemed to be substantially similar to the Technology Assets if it (i) is designed to be installed on equipment used for cooking food for human consumption, and (ii) utilizes electronic rather than electro-

mechanical technology. UEC's temperature sensors, pressure switches, temperature switches (thermostats), thermowells, Sizzle Presses, and Arc Watch technology and future embodiments thereof shall not be deemed to be substantially similar to the Business. Accordingly, UEC covenants and agrees that, commencing on the Effective Date and ending on the expiration date of the '948 Patent, it will not (i) manufacture, sell or offer for sale products within the scope of the Business, (ii) directly or indirectly own, manage, operate, or control or participate in the ownership, management, operation or control of, or provide consulting services to, any business, firm, corporation, partnership, person, proprietorship or other entity which is conducting any business which competes with the Business, (iii) directly or indirectly solicit FAST's customers concerning products within the scope of the Business; (iv) directly or indirectly solicit employment by any person, partnership, corporation or other entity of any of the employees of FAST, or (v) interfere with, or endeavor to entice away from FAST, on behalf of any person, partnership, corporation, or other entity, any customer of FAST concerning products within the scope of the Business. UEC covenants, represents and warrants that there are no current employees in a managerial, supervisory or engineering capacity who were directly and actively involved in the Business except those involved in the finance part of the Business, draftsmen and certain employees who may have assembled certain components of the controllers. UEC further covenants, represents and warrants that there are no nonvoting shareholders of UEC who were directly or actively involved in the Business except Bill Reis III who is not currently involved in the Business. Paul DeRensis, presently a director of UEC and a name partner in the law firm of Deutsch, Williams, Brooks, DeRensis, Holland, and Drachman, P.C. warrants that he is not aware of any existing client or prospective client of the firm that is currently engaged or contemplating to be engaged in the business of making or selling ^{programmable} controllers which are used for the electronic control of food preparation and which are to be sold in competition with FAST.

b. If UEC commits a breach, or threatens to commit a breach, of any of the provisions of Section 3a., FAST shall have the right and remedy, in addition to any others, to have the provisions of this Section 3 specifically enforced by any court having equity jurisdiction, together with an accounting therefor, it being acknowledged and understood by UEC that any such breach or threatened breach will cause irreparable injury to FAST and that money damages will not provide an adequate remedy therefor.

7. RELATIONSHIP

It is expressly agreed that the parties are each an independent contractor, and that it is not the intention of either party to establish a fiduciary relationship, or to undertake a joint venture or to make either party in any sense, an agent, employee, affiliate, associate or partner of the other party. It is further agreed that neither party has any authority to and will not at any time hereafter transact any business in the name of the other party or create or assume in the other party's name or on its behalf in any manner, directly or indirectly, any obligation, express or implied, or act or purport to act as its agent or representative for any purpose.

8. PERSONS TO BE BOUND

This Agreement shall be binding upon and inure to the benefit of the parties hereto, including their respective directors (except directors who are attorneys employed by the law firm of Deutsch, Williams, Brooks, DeRensis, Holland and Drachman, P.C. to the extent that they are performing legal services), officers, voting stockholders, heirs, executors, administrators, assigns and successors in interest and at law. For purposes of this Agreement, the term "UEC" includes UEC's affiliated companies, current directors, current officers, current voting stockholders, Robert Reis, executors, administrators, assigns and successors in interest and at

law. For the purposes of this Agreement, an affiliate of a party shall be all persons or entities that now or hereafter directly or indirectly controls (based on at least a 50% interest), is controlled by, or is under common control with the party.

9. ENTIRE AGREEMENT

This Technology Asset Transfer Agreement and the Settlement Agreement with Exhibits sets forth the entire understanding between the parties and contains all of the terms, provisions, covenants and conditions agreed upon by the parties hereto with reference to the subject matter hereof. This Technology Asset Transfer Agreement shall not be amended, modified or changed, except by written instruments signed by both parties. The parties agree to acknowledge, execute and deliver all such further documents, instruments or assurances and to perform all such further acts or deeds as may be reasonably required from time to time in order to carry out the terms of this Agreement.

10. SEVERABILITY

If any section, paragraph or subparagraph of this Agreement or any portion thereof is held to be indefinite, invalid, illegal or otherwise void, voidable or unenforceable by a court of competent jurisdiction from which no appeal can be taken, such provision shall be curtailed and limited to the extent necessary to bring it within the requirements of the law, and the Agreement shall remain valid and enforceable, and the parties shall be bound by and perform this Agreement as thus modified.

11. GOVERNING LAW; FORUM

The parties agree that any controversy, dispute, question or claim arising out of or in connection with or relating to this Agreement shall be governed by and construed under the laws of the State of Delaware. Moreover, the parties further agree that any controversy or dispute concerning or arising out of this Agreement shall be first referred to Magistrate Judge Zachary Karol, or in the event Magistrate Judge Zachary Karol is unavailable, another judge with authority to mediate disputes within the United States District Court for the District of Massachusetts. If such mediation is unsuccessful in resolving the controversy or dispute, the parties then may initiate litigation in any court having personal and subject matter jurisdiction.

12. ASSIGNMENT

FAST may assign any or all of this Agreement and/or its rights or obligations under this Agreement to any third party without the consent of UEC.

13. NOTICE

All notices and communications required to be given under this Agreement shall be in writing and be deemed to have been properly delivered five (5) days after mailing by certified mail, return receipt requested, or five (5) days after mailing by express mail to the following addresses of the respective parties, or to such other address as either party shall designate in writing to the other:

If to FAST:

Food Automation-Service Techniques, Inc.
905 Honeyspot Road
Stratford, Connecticut 06497

ATTN: Mr. Bernard G. Koether

If to UEC:

United Electric Controls Company
180 Dexter Avenue
Watertown, Massachusetts 02272

ATTN: Mr. David A. Reis

14. MISCELLANEOUS

The section and paragraph headings contained herein are for the convenience of reference only, and shall not for any purpose whatsoever be deemed a part of this Agreement.

IN WITNESS WHEREOF, the parties have signed this Agreement as of the date set forth above.

FOOD AUTOMATION-SERVICE TECHNIQUES, INC.

By: _____

Title: _____

UNITED ELECTRIC CONTROLS COMPANY

By: D. A. Reis

Title: President

EXHIBIT 1

SUBLICENSE AGREEMENT

SUBLICENSE AGREEMENT ("Agreement") made, entered into and effective this 10th day of September, 1997 by and between Food Automation-Service Techniques, Inc., a Delaware corporation with an office and place of business at 905 Honeyspot Road, Stratford, Connecticut 06497 (hereinafter referred to as "FAST" or the "Licensee") and United Electric Controls Company, a Massachusetts corporation having a principal place of business at 180 Dexter Avenue, Watertown, Massachusetts 02272 (hereinafter referred to as "UEC" or the "Licensor").

WHEREAS, FAST and UEC have entered into a Settlement Agreement with exhibits effective September 10, 1997 and a Technology Asset Transfer Agreement effective September 10, 1997, the terms of both of which are incorporated herein by reference, in connection with the action in the United States District Court District of Massachusetts captioned Food Automation-Service Techniques, Inc. v. United Electric Controls Company, C.A. No. 95-12663 (RCL) (the "Lawsuit").

WHEREAS, UEC is the assignee, owner or exclusive licensee of certain United States patents and technology relating to the electronic control of food preparation in accordance with the Agreement For The Purchase And Sale Of Assets And License Of Technology between Rotary Controls Corporation dba Cooking Automation Systems Division and Louis Polster and United Electric Controls Company, dated July 31, 1986, and has agreed to grant FAST a sublicense under said patents and technology as partial consideration for settlement of the Lawsuit;

WHEREAS, FAST has agreed to receive this sublicense as partial consideration for settlement of the lawsuit;

NOW, THEREFORE, IT IS AGREED AND UNDERSTOOD as follows:

1. DEFINITIONS

1.1 "Licensed Patents and Technology" shall mean United States Patent No. 4,506,995 issued on March 26, 1985, United States Patent No. 4,503,320 issued on March 5, 1985, United States Patent No. 4,362,094 issued on December 7, 1982 and United States Patent No. 4,238,995 issued on December 16, 1980 and the technology transferred to UEC pursuant to the Agreement For The Purchase And Sale Of Assets And License Of Technology between Rotary Controls Corporation dba Cooking Automation Systems Division and Louis Polster and United Electric Controls Company, dated July 31, 1986, which agreement and its applicable terms are incorporated by reference herein.

1.2 "Licensed Products" shall mean any product or method covered by any claim of the Licensed Patents.

2. GRANT OF RIGHTS

2.1 Sublicense. Subject to the terms and conditions of this Agreement, including without limitation Section 3, Licensor hereby grants to FAST an irrevocable, unlimited sublicense under the Licensed Patents and Technology to develop, make, have made, use, sell and/or offer to sell Licensed Products and any variations and improvements on the Licensed Products. Said right and license shall be royalty-free and FAST shall not hereby incur any obligation of accounting to Licensor or any other entity with an interest in the Licensed Patents.

2.2 Term Of Grant. The grant of rights and licenses by Licensor to FAST pursuant to Section 2.1 shall be coextensive with the term of the latest-expiring of the Licensed Patents.

2.3 Sublicensing Rights. The grant of rights and licenses by Licensor to FAST pursuant to Section 2.1 shall include any right to grant sublicense rights to any party.

3. REPRESENTATIONS AND WARRANTIES OF LICENSOR

3.1 Licensor represents and warrants that (i) Licensor has not granted any rights under the Licensed Patents and Technology that are inconsistent with the rights and licenses granted to FAST hereunder; (ii) Licensor will not grant any further rights and licenses under the Licensed Patents and Technology to any third party; and (iii) Licensor believes it has full power, right and authority to grant the rights and licenses granted to FAST in this Agreement.

3.2 Licensor represents and warrants that it owns no patent applications relating to the Licensed Patents and Technology pending with the United States Patent and Trademark Office.

4. TERM OF AGREEMENT

The term of this Agreement shall commence upon the Effective Date and continue in full force and effect until the date of expiration, revocation or invalidation of all claims of the Licensed Patents and Technology. The license grant provided for in Section 2.1 shall be irrevocable.

5. RELATIONSHIP

It is expressly agreed that the parties are each an independent contractor, and that it is not the intention of either party to establish a fiduciary relationship, or to undertake a joint venture or to make either party in any sense, an agent, employee, affiliate, associate or partner of the other party. It is further agreed that neither party has any authority to and will not at any time hereafter transact any business in the name of the other party or create or assume in the other party's name or on its behalf in any manner, directly or indirectly, any obligation, express or implied, or act or purport to act as its agent or representative for any purpose.

6. PERSONS TO BE BOUND

This Agreement shall be binding upon and inure to the benefit of the parties hereto, including their respective directors (except directors who are attorneys employed by the law firm of Deutsch, Williams, Brooks, DeRensis, Holland and Drachman, P.C. to the extent that they are performing legal services), officers, voting stockholders, heirs, executors, administrators, assigns and successors in interest and at law. For purposes of this Agreement, the term "UEC" includes UEC's affiliated companies, current directors, current officers, current voting stockholders, Robert Reis, executors, administrators, assigns and successors in interest and at law. For the purposes of this Agreement, an affiliate of a party shall be all persons or entities that now or hereafter directly or indirectly controls (based on at least a 50% interest), is controlled by, or is under common control with the party.

7. ENTIRE AGREEMENT

This Sublicense Agreement, Settlement Agreement with exhibits and Technology Asset Transfer Agreement set forth the entire understanding between the parties and contains all of the terms, provisions, covenants and conditions agreed upon by the parties hereto with reference to the subject matter hereof. This Sublicense Agreement shall not be amended, modified or changed, except by written instruments signed by both parties. The parties agree to acknowledge, execute and deliver all such further documents, instruments or assurances and to perform all such further acts or deeds as may be reasonably required from time to time in order to carry out the terms of this Agreement.

8. SEVERABILITY

If any section, paragraph or subparagraph of this Agreement or any portion thereof is held to be indefinite, invalid, illegal or otherwise void, voidable or unenforceable by a court of competent jurisdiction from which no appeal can be taken, such provision shall be curtailed and limited to the extent necessary to bring it within the requirements of the law, and the Agreement shall remain valid and enforceable, and the parties shall be bound by and perform this Agreement as thus modified.

9. GOVERNING LAW; FORUM

The parties agree that any controversy, dispute, question or claim arising out of or in connection with or relating to this Agreement shall be governed by and construed under the laws of the State of Delaware. Moreover, the parties further agree that any controversy or dispute concerning or arising out of this Agreement shall be first referred to Magistrate Judge Zachary Karol, or in the event Magistrate Judge Zachary Karol is unavailable, another judge with authority to mediate disputes within the United States District Court for the District of Massachusetts. If such mediation is unsuccessful in resolving the controversy or dispute, the parties then may initiate litigation in any court having personal and subject matter jurisdiction.

10. ASSIGNMENT

FAST may assign any or all of this Agreement and/or its rights or obligations under this Agreement to any third party without the consent of UEC.

11. NOTICE

All notices and communications required to be given under this Agreement shall be in writing and be deemed to have been properly delivered five (5) days after mailing by certified mail, return receipt requested, or five (5) days after mailing by express mail to the following addresses of the respective parties, or to such other address as either party shall designate in writing to the other:

If to FAST:

Food Automation-Service Techniques, Inc.
905 Honeyspot Road
Stratford, Connecticut 06497

ATTN: Mr. Bernard G. Koether

If to UEC:

United Electric Controls Company
180 Dexter Avenue
Watertown, Massachusetts 02272


ATTN: Mr. David A. Reis

12. MISCELLANEOUS

The section and paragraph headings contained herein are for the convenience of reference only, and shall not for any purpose whatsoever be deemed a part of this Agreement.

IN WITNESS WHEREOF, the parties have signed this Agreement as of the date set forth
above.

FOOD AUTOMATION-SERVICE TECHNIQUES, INC.

By: 

Title: Chairman

UNITED ELECTRIC CONTROLS COMPANY

By: 

Title: President

EXHIBIT 2

U.S. Patent No. 4,506,995 (expired 1/26/89)

SCHEDULE 1

SCHEDULE 1

UEC will provide FAST all the documentation and the software in its possession, custody or control related to the following identified controller numbers and other information contained in the following listing taken from Schedule 6.02 of the Athena Agreement. The following U.S. patents also constitute part of the Technology Assets to be transferred from UEC to FAST:

U.S. Patent Numbers:

4,503,320

4,362,094

4,238,995

Part #	Rev	SC	Drawing #	Description
Y8021	G	MP	13294	BLODGETT HOISTER CONVEYOR
Y8024	J	MN	NONE	(ND) ADAMATIC TWO VERT WB2
Y8026	J	MN	13303	BAKERS AID HYDRAULIC
Y8083	J	XM	13344	BLODGETT 1/2 CONNECTION
Y8024	C	XM	13361	BLODGETT CONNECTION (FULL)
Y8035	L	XM	13305	WELL AU BON PAIN
Y8035-1	F	XM	13335	COMPUTER (AU BON PAIN)
Y8038	L	XM	13330	BAKERS AID PROOF RETARD
Y8041	K	XM	13318	KFC ROTISSERIE OVEN
Y8043	G	MN	13340	BAKERS AID T63003
Y8047	F	MN	13332	BAKERS AID SHALLOW BODYW2
Y8048	C	XM	13360	BLODGETT 1/2 CONNECTION
Y8049	D	MP	13338	BLODGETT OTAU
Y8051	E	XM	13333	HARDT/KFC
Y8052	E	XM	13341	OLIVER PROD.
Y8052-1	E	XM	13341	WB2 OLIVER
Y8054	E	XM	13343	TRADEMARK
Y8055	C	XM	13358	BLODGETT SELF CLEAN (FULL)
Y8058	C	XM	13359	HICKORY INDUSTRIES
82158-84	A	XM	NONE	POWER ASSY
82158-85	A	XM	NONE	CABLE, BB-25, 8FT
82158-86	A	XM	NONE	CABLE, BB-25, 10FT
82158-87	B	XM	NONE	IFU ASSY, REMOTE
82158-88	A	XM	NONE	CABLE, BB-25, RT, ANG, 10FT
82158-89	B	XM		REMOTE IFU
82158-91	B	XM		Y8054 IFU, REMOTE
82158-88	A	XM	NONE	Y8058 REMOTE IFU ASSY

EXHIBIT D

NON-COMPETITION AGREEMENT

AGREEMENT made this 10th September day of ~~August~~, 1997, by and between Food Automation-Service Techniques, Inc., a Delaware corporation with an office and place of business at 905 Honeyspot Road, Stratford, Connecticut 06497 (hereinafter referred to as "FAST") and Robert Reis, an individual residing at 11 Seal Cove, Hingham, Massachusetts (hereinafter referred to as "Reis").

WHEREAS, in connection with the action in the United States District Court District of Massachusetts captioned Food Automation-Service Techniques, Inc. v. United Electric Controls Company, C.A. No. 95-12663 (RCL), the parties thereto entered into a Settlement Agreement dated Sept 10, 1997 (the "Settlement Agreement") the terms of which are incorporated herein by reference; and

WHEREAS, Reis, formerly an Officer and shareholder of United Electric Controls Company ("UEC"), had, during the term of his employment by UEC, substantial knowledge of and involvement in the UEC technology, controls in accordance with that technology, and activities that are the subject of the above-mentioned litigation and the Settlement Agreement; and

WHEREAS, Reis has agreed to enter into this Agreement as partial consideration to FAST for the Settlement Agreement with UEC.

NOW, THEREFORE, in consideration of the premises and mutual agreements contained herein and in the Settlement Agreement, the sufficiency of which are hereby acknowledged, intending to be legally bound hereby, the parties hereto agree as follows:

1. DEFINITIONS:

(a) The term "Technology Assets" shall mean the technology listed in Schedule 1 of the Technology Asset Transfer Agreement between FAST and UEC dated _____, 1997, the terms of which are incorporated herein by reference, and controls in accordance with that technology. Such Technology Assets shall include, without limitation, inventions, know-how, trade secrets, manufacturing, marketing and sales information and intellectual property relating to electronic control of food preparation know to or otherwise in the possession, custody, or control of Reis or UEC, including the technology identified in Schedule 6.02 in the Asset Sale Agreement between Athena Controls, Inc. and UEC dated August 15, 1996.

(b) The term "'948 Patent" shall mean United States Letters Patent No. 4,920,948.

(c) The term "Customer(s)" shall mean anyone who has a commercial relationship with FAST.

2. NON-COMPETITION

(a) The recognition by Reis that he will not engage or otherwise participate in the business of manufacturing, using, selling or offering for sale electronic controls for food preparation that are substantially similar to the Technology Assets (the "Business") is, in part, a principal inducement to FAST for entering into the Settlement Agreement. A product shall be deemed to be substantially similar to the Technology Assets if it (i) is designed to be installed on equipment used for cooling food for human

consumption, and (ii) utilizes electronic rather than electro-mechanical technology. UEC's temperature sensors, pressure switches, temperature switches (thermostats), thermowells, Sizzle Presses, and Arc Watch technology and future embodiments thereof shall not be deemed to be substantially similar to the Business. Accordingly, Reis covenants and agrees that, commencing on the Effective Date and ending on the expiration date of the '948 Patent, he will not (i) manufacture, sell or offer for sale products within the scope of the Business, (ii) directly or indirectly own, manage, operate, or control or participate in the ownership, management, operation or control of, or provide consulting services to, any business, firm, corporation, partnership, person, proprietorship or other entity which is conducting any business which competes with the Business, (iii) directly or indirectly solicit FAST's Customers concerning products within the scope of the Business; (iv) directly or indirectly solicit employment by any person, partnership, corporation or other entity of any of the employees of FAST, or (v) interfere with, or endeavor to entice away from FAST, on behalf of any person, partnership, corporation, or other entity, any Customer of FAST concerning products within the scope of the Business.

(b) If Reis commits a breach, or threatens to commit a breach, of any of the provisions of Section 2(a), FAST shall have the right and remedy, in addition to any others, to have the provisions of this Section 2 specifically enforced by any court having equity jurisdiction, together with an accounting therefor, it being acknowledged and understood by Reis that any such breach or threatened breach will cause irreparable injury to FAST and that money damages will not provide an adequate remedy therefor.

3. RELATIONSHIP

It is expressly agreed that the parties are each an independent contractor, and that it is not the intention of either party to establish a fiduciary relationship, or to undertake a joint venture or to make either party in any sense, an agent, employee, affiliate, associate or partner of the other party. It is further agreed that neither party has any authority to and will not at any time hereafter transact any business in the name of the other party or create or assume in the other party's name or on its behalf in any manner, directly or indirectly, any obligation, express or implied, or act or purport to act as its agent or representative for any purpose.

4. PERSONS TO BE BOUND

This Agreement shall be binding upon and inure to the benefit of the parties hereto, including their respective directors, officers, stockholders, heirs, executors, administrators, assigns and successors in interest and at law. For the purposes of this Agreement, an affiliate of a party shall be all persons or entities that now or hereafter directly or indirectly controls (based on at least a 50% interest), is controlled by, or is under common control with the party.

5. ENTIRE AGREEMENT

This Non-Competition Agreement, the Settlement Agreement, and the Technology Asset Transfer Agreement set forth the entire understanding between the parties and contains all of the terms, provisions, covenants and conditions agreed upon by the parties hereto with reference to the subject matter hereof. This Non-Competition Agreement shall not be

amended, modified or changed, except by written instruments signed by both parties. The parties agree to acknowledge, execute and deliver all such further documents, instruments or assurances and to perform all such further acts or deeds as may be reasonably required from time to time in order to carry out the terms of this Agreement.

6. SEVERABILITY

If any section, paragraph or subparagraph of this Agreement or any portion thereof is held to be indefinite, invalid, illegal or otherwise void, voidable or unenforceable by a court of competent jurisdiction from which no appeal can be taken, such provision shall be curtailed and limited to the extent necessary to bring it within the requirements of the law, and the Agreement shall remain valid and enforceable, and the parties shall be bound by and perform this Agreement as thus modified.

7. GOVERNING LAW; FORUM

The parties agree that any controversy, dispute, question or claim arising out of or in connection with or relating to this Agreement shall be governed by and construed under the laws of the State of Delaware. Moreover, the parties further agree that any controversy or dispute concerning or arising out of this Agreement shall be first referred to Magistrate Judge Zachary Karol, or in the event Magistrate Judge Zachary Karol is unavailable, another judge with authority to mediate disputes within the United States District Court for the District of Massachusetts. If such mediation is unsuccessful in resolving the controversy or dispute, the parties then may initiate litigation in any court having personal and subject matter jurisdiction.

8. ASSIGNMENT

FAST may assign any or all of this Agreement and/or its rights or obligations under this Agreement to any third party without the consent of Reis or UEC.

9. NOTICE

All notices and communications required to be given under this Agreement shall be in writing and be deemed to have been properly delivered five (5) days after mailing by certified mail, return receipt requested, or five (5) days after mailing by express mail to the following addresses of the respective parties, or to such other address as either party shall designate in writing to the other:

If to FAST:

Food Automation-Service Techniques, Inc.
905 Honeyspot Road
Stratford, Connecticut 06497

ATTN: Mr. Bernard G. Koether

If to Reis:

11 Seal Cove
Hingham, Massachusetts

ATTN: Mr. Robert Reis

With a copy to UEC:

United Electric Controls Company
180 Dexter Avenue
Watertown, Massachusetts 02272

ATTN: Mr. David A. Reis

10. MISCELLANEOUS

The section and paragraph headings contained herein are for the convenience of reference only, and shall not for any purpose whatsoever be deemed a part of this Agreement.

IN WITNESS WHEREOF, the parties have signed this Agreement as of the date set forth above.

FOOD AUTOMATION-SERVICE TECHNIQUES, INC.

By: _____

Title: _____

ROBERT REIS

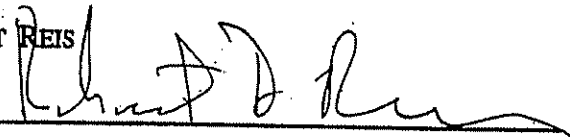
A handwritten signature in dark ink, appearing to read "Robert Reis", is written over a horizontal line.

EXHIBIT E

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

FOOD AUTOMATION - SERVICE
TECHNIQUES, INC.

Plaintiff,

v.

UNITED ELECTRIC CONTROLS
COMPANY

Defendant.

Civil Action No:
95-12663-RCL

DECLARATION OF UNITED ELECTRIC CONTROLS COMPANY

David A. Reis hereby declares:

1. I am President of United Electric Controls Company (hereinafter referred to as "UEC"), defendant in the above captioned case and make this binding declaration on behalf of UEC in connection with settlement of the above captioned case and as partial consideration for such settlement.

2. UEC represents that all documents and physical materials including UEC attorney work product and attorney-client privileged documents relating to UEC's defenses therein, except documents which relate only to the conduct of the litigation, or which are totally unrelated to the '948 patent or which contain nothing that relates to the substance of UEC's patent defenses or which solely relate to the negotiations and agreement between UEC and

Athena Controls, Inc., have been transferred to Pennie & Edmonds LLP and that neither UEC nor its attorneys have retained any such documents or copies thereof in any form.

3. I declare under the penalty of perjury that the foregoing is true and correct.

Executed on September ^{nh}11, 1997.

Boston, Massachusetts

UNITED ELECTRIC CONTROLS COMPANY

By:

D. A. Reis

Title:

President

[Signature]

John Foskett

BBO No. 175540

DEUTSCH WILLIAMS BROOKS

DeRENSIS HOLLAND & DRACHMAN, P.C.

99 Summer Street

Boston, MA 02110-1235

(617) 951-2300

[Signature]

Lawrence M. Green

BBO No. 209080

WOLF GREENFIELD & SACKS, P.C.

600 Atlantic Avenue

Boston, Massachusetts 02110

(617) 720-3500

Counsel to United Electric Controls Company

EXHIBIT W

**(FAST.)***The Time
Is Right*

CORPORATE

HOT NEWS

PRODUCTS

TEAM FAST

SUPPORT

OEM

WORLDWIDE

INTERNATIONAL

CONTACT US

EMPLOYMENT

HOME



Contact directions

[Fill out our info request form.](#)

Home Office USA

FOOD AUTOMATION - SERVICE TECHNIQUES, INC.

905 Honeyspot Road

Stratford, CT 06615 USA

Phone: **203-377-4414**

Fax: **203-377-8187**

Sales: 1-800-FASTRON (**1-800-327-8766**) outside CT
(Monday-Friday, 8:00am - 5:00pm Eastern Time USA)
sales@fastinc.com

International Callers: **+1-203-378-6860**
(Monday-Friday, 8:00am - 5:00pm Eastern Time USA)
international@fastinc.com

24-Hour Tech. Support Service: **1-800-243-9271**
(from the U.S., Canada and the Caribbean)
tech_support@fastinc.com

DIRECTIONS

[View a map of the surrounding area, or get driving directions to FAST.](#)



I-95 North from New York

Exit 30 (Lordship Boulevard). Bear right at end of ramp. Proceed 0.5 miles and take first left after railroad crossing onto Honeyspot Road. FAST is located on the right at corner of second block.



I-95 South from New Haven

Exit 31 (South Avenue). End of exit, continue straight to second stop sign. Turn left onto Honeyspot Road. FAST is located 0.7 miles on the left (corner of Garfield Avenue and Honeyspot Road).



I-91 South from Bradley Airport

I-91 to 95 South. Exit 31 (South Avenue). End of exit, continue straight to second stop sign. Turn left onto Honeyspot Road. FAST is located 0.7 miles on the left (corner of Garfield Avenue and Honeyspot Road).

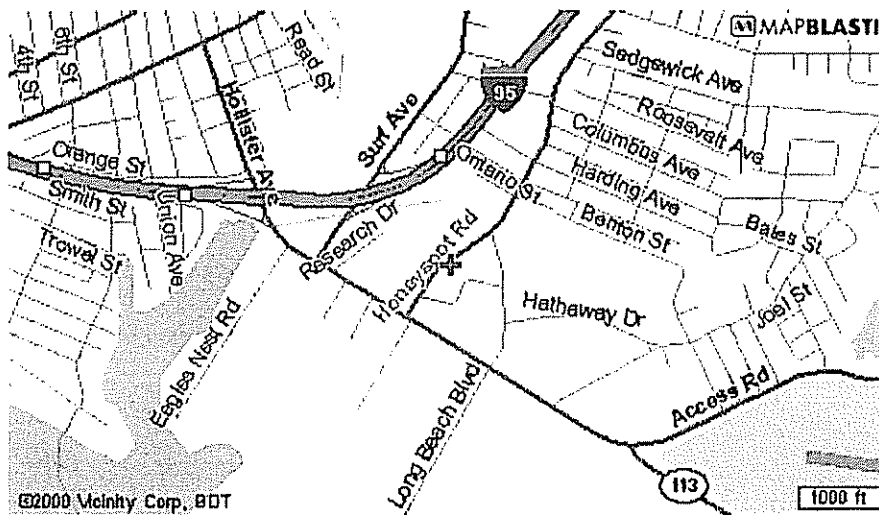
▲ I-95 North from Newark Airport

Exit 30 (Lordship Boulevard). Bear right at end of ramp. Proceed 0.5 miles and take first left after railroad crossing onto Honeyspot Road. FAST is located on the right at corner of second block.

▲ Rte. 8 from Waterbury

Route 8 South to I-95 North. Exit 30 (Lordship Boulevard). Bear right at end of ramp. Proceed 0.5 miles and take first left after railroad crossing onto Honeyspot Road. FAST is located on the right at corner of second block.

▲ Click on the map below for more detailed instructions. You can also get "Driving Directions" to FAST after clicking on this map.



Click on the map to browse

Wednesday, February 21, 2007

1-800-FASTRON

Questions or comments: webmaster@fastinc.com

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Service Techniques, Inc

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EXHIBIT X


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Headquarters
 SCK
 905 Honeyspot Road
 Stratford, CT 06615-7147 USA
 203.377.4174 voice
 203.377.8187 fax
info@mysck.com

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sales@mysck.com

International Callers
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international@mysck.com

Technical Support
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 1.866.840.4271, press option 2
 Hours: 24 hours a day, 7 days a week
support@mysck.com

International Callers
 +1.203.378.6860
 Hours: Mon - Fri, 8:00am - 5:00pm, Eastern Standard Time, USA
support@mysck.com

Webmaster
 Michelle Narus
mnarus@mysck.com

Careers
 Pat Balkonis
pbalkonis@mysck.com

EXHIBIT Y

**UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS**

**FOOD AUTOMATION - SERVICE
TECHNIQUES, INC.,**

Plaintiff,

v.

**UNITED ELECTRIC CONTROLS
COMPANY,**

Defendant.

**Civil Action No.:
95-12663-RCL**

**FOOD AUTOMATION - SERVICES TECHNIQUES, INC.'S
INITIAL DISCLOSURES PURSUANT TO RULE 26(a)(1)**

Plaintiff, Food Automation - Services Techniques, Inc. ("FAST"), hereby submits the following Initial Disclosures, pursuant to Federal Rule of Civil Procedure 26(a). These disclosures are based on information reasonably available to FAST as of this date.

By making these disclosures, FAST does not represent that it is identifying every document, tangible thing, or witness possibly relevant to this lawsuit. Nor does FAST waive its right to object to production of any document or tangible thing disclosed on the basis of any privilege, the work product doctrine, relevancy, undue burden or any other valid objection. FAST's disclosures represent a good faith effort to identify information it reasonably believes is required by Rule 26(a). Because discovery in this matter is ongoing, FAST reserves the right to amend or supplement the disclosure as necessary.

FAST's disclosures are made without in any way waiving: (1) (a) the right to object on the grounds of competency, privilege, relevancy and materiality, hearsay, or any other proper ground, (b) the right to object to the use of any such information, for any

purpose, in whole or in part, in any subsequent proceeding in this action or any other action; or (2) the right to object on any and all grounds, at any time, to any other discovery request or proceeding involving or relating to the subject matter of these disclosures.

DEFINITIONS

For the purposes of this disclosure, the terms set forth below are defined as follows:

1. "The '948 patent" as used herein shall mean United States Patent No. 4,920,948, which issued May 1, 1990.
2. "FAST" as used herein shall mean plaintiff in the above-identified matter, Food Automation - Service Techniques, Inc., which is located at 905 Honeyspot Road, Stratford, Connecticut 06497, (203) 377-4414.

A. IDENTIFICATION OF PERSONS

The following individuals, other than experts, are believed by FAST to possess knowledge or information relevant to the present dispute.

1. Charles A. Blank, Felfe & Lynch, 805 Third Avenue, New York, NY, 10022, (212) 688-9200. Mr. Blank is likely to have knowledge on at least the following subjects: preparation and prosecution of the '948 patent.
2. Mario G. Ceste, Director of Business Development, FAST. Mr. Ceste is likely to have knowledge on at least the following subjects: marketing and sales of FAST oven controllers; research and development of FAST oven controllers; competitive analysis of oven controlling devices made and sold by others.
3. Charles Heron, Director of Accounting, FAST. Mr. Heron is likely to have knowledge on at least the following subject: financial operations of FAST.

4. Keith Hessler, former FAST Production Manager. Mr. Hessler is likely to have knowledge on at least the following subjects: manufacture and assembly of FAST oven controllers that utilize the technology that is the subject matter of the '948 patent.
5. Bernard G. Koether, Chairman and CEO, FAST. Mr. Koether is likely to have knowledge on at least the following subjects: the founding, organization and operations of FAST; research, design and development of the subject matter described in the '948 patent; preparation of the '948 patent application; and the manufacture, marketing, sale and use of FAST oven controllers.
6. Frank McGinn, former FAST Manufacturing Manager. Mr. McGinn is likely to have knowledge on at least the following subjects: manufacture and assembly of FAST oven controllers that utilize the technology that is the subject matter of the '948 patent.
7. Mario Pasquini, former FAST employee, believed to be currently employed by United Electric Controls Company. Mr. Pasquini is likely to have knowledge on at least the following subjects: development of the subject matter described in the '948 patent; preparation of the '948 patent application; design, development and manufacture of oven controllers made and sold by United Electric Controls Company.
8. Allan E. Witt, former Senior Vice President, FAST. Mr. Witt is likely to have knowledge on at least the following subjects: marketing, sales, and manufacture of FAST oven controllers; installation, maintenance, and customer support of FAST oven controllers.
9. Any and all witnesses identified by United Electric Controls Company.

B. GENERAL DESCRIPTION OF DOCUMENTS

In accordance with the FRCP 26(a)(1), FAST offers the following general description of the documents in its custody and control which may bear significantly on claims and defenses of this action:

- (a) Documents concerning U.S. Patent No. 4,920,948;
- (b) Documents, including articles, publications, and patents, concerning baking oven computers;

- (c) Documents concerning the research, design, and development of FAST's Combi-Oven controllers;
- (d) Documents concerning the specifications and manufacture of FAST's Combi-Oven controllers;
- (e) Documents concerning the labelling for FAST's Combi-Oven controllers;
- (f) Documents concerning the use and performance of FAST's Combi-Oven controllers;
- (g) Documents concerning the installation and maintenance of FAST's Combi-Oven controllers;
- (h) Documents concerning FAST advertising, marketing, and promotion;
- (i) Documents concerning sales of FAST's patented Combi-Oven controllers;
- (j) Documents concerning infringement of the '948 patent by United Electric Controls Company, including literature regarding the performance and features of oven controllers made and sold by United Electric Controls Company.

Location. All of the documents described above are located at the offices of FAST or in New York, New York at the offices of Pennie & Edmonds. By giving the foregoing description of documents pursuant to Rule 26(a)(1), FAST does not waive its right to refrain from the production of any document in its possession which is subject to protection under the attorney-client privilege, the work-product doctrine or any other immunity doctrine, or which FAST is prohibited from producing under a legitimate confidentiality agreement, or where production of such a document would be otherwise unlawful, or in response to a request for the production of documents that is objectionable. FAST retains the right to object to any request for production which is overly broad, unduly

burdensome, or seeks the production of documents that are not relevant to this lawsuit or not reasonably calculated to lead to the discovery of admissible evidence.

C. DAMAGES

Pursuant to Rule 26(a)(1)(C), upon information and belief, the amount and type of plaintiff's damages in this matter have yet to be determined based on the lack of discovery to date and the fact that documents and information necessary to any damages calculation are in the possession and custody of defendant. However, damages including but not limited to lost profits and/or a reasonable royalty should be awarded to plaintiff to compensate FAST for defendant's infringement of one or more claims of the '948 patent. Subject to the foregoing, FAST estimates its lost profit damages as approximately 10 million dollars (\$10,000,000).

Furthermore, such damages should be increased to three times the amount found or assessed based on defendant's infringement of such claims of the '948 patent being willful, wanton and deliberate, without license or excuse, and with full knowledge of the '948 patent. Moreover, plaintiff should be awarded its cost and disbursements in this action, including reasonable attorneys' fees, prejudgment interest, and other such relief as this court deems just and proper.

D. EXISTENCE OF INSURANCE AGREEMENT

Pursuant to Rule 26(a)(1)(D), FAST is not aware of the existence of any insurance agreement under which any person carrying on an insurance business may be liable

to satisfy partly or all of a judgment which may be entered in the action or to indemnify or reimburse for payment made to satisfy the judgment.

Dated: June 7, 1996

Respectfully submitted,

James Coyne King *(signature)*
James Coyne King
(BBO #272620)

HANIFY & KING
Professional Corporation
One Federal Street
Boston, MA 02110-2007
(617) 423-0400

Attorney for Food Automation-Service
Techniques, Inc.

Of Counsel:

Rory J. Radding
Todd A. Wagner
PENNIE & EDMONDS
1155 Avenue of the Americas
New York, New York 10036
(212) 790-9090

EXHIBIT Z

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TECHNOLOGY LICENSING CORPORATION,)	
a Florida corporation,)	
)	
Plaintiff,)	C.A. No. 06-515 (JJF)
)	
v.)	
)	
RATIONAL COOKING SYSTEMS, INC., a)	
Delaware corporation,)	
)	
Defendant.)	

**TLC'S OBJECTIONS AND RESPONSES TO
DEFENDANT'S FIRST SET OF INTERROGATORIES (NOS. 1-11)**

Pursuant to Rules 26 and 33 of the Federal Rules of Civil Procedure and the Local Civil Rules of the District of Delaware, Technology Licensing Corporation ("TLC") hereby responds to Rational Cooking Systems, Inc.'s ("Rational's") First Set of Interrogatories. As discovery is ongoing, TLC's responses may be modified and/or supplemented as additional information becomes known to TLC.

PRELIMINARY STATEMENT AND GENERAL OBJECTIONS

TLC asserts the following general objections to Rational's First Set of Interrogatories and First Set of Document Requests and incorporates these general objections into each response set forth below.

1. TLC objects to each instruction, definition, and interrogatory or request to the extent that the instruction, definition, interrogatory, or request purports to impose any requirement or discovery obligation on TLC greater than or inconsistent with those imposed by law, the Federal Rules of Civil Procedure, the Local Rules of this Court, or any other applicable rules

2. TLC objects to each interrogatory and/or request to the extent that it calls for the disclosure of information protected by attorney-client privilege, joint-defense privilege, work-product immunity, and any other applicable rule of privilege or confidentiality afforded under the applicable laws of the United States, including any applicable right of privacy.

3. TLC objects to terms and phrases defined or used by Rational to the extent that those terms and/or phrases are vague and/or ambiguous or beyond their customary meaning. To the extent TLC adopts any terms or phrases defined or used by Rational, they are adopted solely for the sake of convenience in responding to these interrogatories and/or requests, and TLC does not accept or concede that any of the terms, phrases, or definitions are appropriate, descriptive, or accurate.

4. TLC objects to the definitions of "you," "your," and "TLC" on the ground that they are overly broad and inconsistent with the applicable discovery rules by purporting to require TLC to search for and provide information not in its own possession, custody, or control, but rather in the possession, custody, or control of other companies or former employees. TLC's response to these interrogatories and/or requests is limited to knowledge and information within TLC's possession, custody, or control and is intended to be the response of TLC only.

5. TLC objects to the definitions of "possession," "custody," and "control" on the ground that they are overly broad and inconsistent with the applicable discovery rules by purporting to require TLC to search for and provide information not in its own possession, custody, or control, but rather in the possession, custody, or control of other companies or former employees. TLC's response to these interrogatories and/or requests is limited to knowledge and information within TLC's possession, custody, or control and is intended to be the response of TLC only.

6. TLC objects to the definitions of "Food Automation-Service Techniques, Inc." and "FAST" on the ground that they are overly broad and to the extent that they purport to impose discovery obligations in excess of those required under the Federal and Local Rules. FAST is not a party to this litigation. In the event that FAST and Rational reach an agreement regarding the production of any FAST documents, that agreement will be based on Rational's subpoena to FAST and not Rational's discovery requests to TLC.

7. TLC objects to each interrogatory and/or request on the ground that they are overly broad and to the extent that they purport to impose discovery obligations in excess of those required under the Federal and Local Rules. Bernard Koether is not a party to this litigation as an individual. In the event that Bernard Koether and Rational reach an agreement regarding the production of any of his personal documents, that agreement will be based on Rational's subpoena to Bernard Koether and not Rational's discovery requests to TLC.

8. TLC objects to the definition of "concerning" on the grounds that it is vague, ambiguous, overly broad, unduly burdensome, and not reasonably calculated to lead to the discovery of admissible evidence. TLC objects to this term to the extent that it suggests that TLC must search for all information that somehow relates to some subject matter identified by Rational. This term does not describe identifiable categories of information that TLC can search for and produce without suffering undue burden. TLC will interpret this term to have its customary meaning, broadly or narrowly construed as is reasonable under the circumstances.

9. TLC objects to each interrogatory and/or request to the extent that it is not specifically limited to any time period relevant to this litigation and thereby seeks information that is irrelevant to the subject matter of this lawsuit and not reasonably likely to lead to the discovery of admissible evidence.

10. TLC objects to each interrogatory and/or request to the extent that it seeks disclosure of information that is equally or more readily available to Rational as to TLC.

11. TLC objects to each interrogatory and/or request to the extent that it is duplicative or cumulative of another interrogatory and/or request.

12. TLC objects to each interrogatory and/or request to the extent that it requires TLC to draw legal conclusions.

13. TLC objects to each interrogatory and/or request to the extent that it purports to require a search of information not within the possession, custody, or control of TLC.

14. TLC objects to disclosing information containing or reflecting proprietary information, trade secrets, or other confidential information belonging to TLC.

15. TLC objects to disclosing information containing or reflecting proprietary information, trade secrets, or other confidential information entrusted to it by non-parties. Much of such material is irrelevant to any issue that may arise in this litigation, and any possible marginal relevance would be outweighed by the potential harm to TLC's current and future business relationships and opportunities if such information were produced. TLC further objects on the ground that disclosing such information could be in violation of TLC's obligations under confidentiality arrangements with third parties and would be unduly burdensome, oppressive, and anti-competitive.

16. TLC objects to the total number of interrogatories served by Rational in this litigation to the extent that number exceeds the 50 interrogatories agreed between the parties, including discrete subparts. TLC further objects to these interrogatories to the extent that they include subparts which are not numbered as such. TLC shall treat each discrete subpart as a separate interrogatory.

17. By responding and disclosing information, TLC does not concede the relevancy or materiality of the interrogatory and/or request or of the subject to which such interrogatory and/or request refers. TLC's responses are made expressly subject to, and without in any way waiving or intending to waive, any questions or objections as to the competence, relevance, materiality, privilege, or admissibility as evidence or for any other purpose, of any of the documents referred to or produced or of the responses given herein, or of the subject matter thereof, in any proceeding (including the trial of this action or in any subsequent proceeding). The responses and production are made subject to TLC's right to object to any discovery proceeding involving or relating to the subject matter of the interrogatory responded to herein.

18. In the interest of expediting discovery, TLC has been making prompt and diligent reviews of its potentially responsive information, accompanied by what TLC feels to be reasonable safeguards against the production of privileged or otherwise protected or non-responsive documents. If, despite such efforts, TLC does in fact produce one or more such documents, such production will have been inadvertent and shall not be deemed to waive any legal protection that attaches to such document(s). TLC objects to any reading, copying, summarizing or other use by Rational of such document(s), and requests that Rational immediately notify TLC of any instance where it knows, or reasonably suspects, that such an inadvertent production has occurred, and immediately return such document(s) to TLC.

19. TLC objects to these interrogatories and/or requests as unreasonably burdensome to the extent that Rational seeks production of electronic documents in native format. TLC will produce such documents in accordance with the Federal Rules of Civil Procedure

20. These responses are based on information presently known to TLC and are given without prejudice to TLC's right to produce evidence of any subsequently discovered documents or facts, and to present evidence of subsequently discovered documents or facts in depositions, at trial, and in support of, or opposition to, any motion.

21. Notwithstanding its specific responses to any particular interrogatory, TLC does not waive any of the general objections made herein, each of which is incorporated into each and every specific response as if set forth in full therein.

RESPONSE TO INTERROGATORIES

Interrogatory No. 1.

Describe (by way of a claim chart) the basis for TLC's infringement assertions as follows: Identify each claim of the '948 patent that TLC contends a Rational product has infringed or is infringing either directly or indirectly, state whether such alleged infringement is literal or under the doctrine of equivalents, and describe the complete factual basis and evidentiary support for the presence of each element of each asserted claim either literally or by way of a substantial equivalent and identify three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 1

TLC objects to this interrogatory insofar as the Court has not yet construed the claims of the '948 Patent. TLC objects to this interrogatory on the grounds that it is premature because discovery in this matter is just beginning, and Rational has not yet produced any documents to TLC. TLC reserves the right to modify or supplement its responses as TLC locates additional information, or based on a ruling from the Court.

Subject to the foregoing, and the General Objections, Exhibit A presents a preliminary claim chart showing that each of the elements of claims 1, 2, 3, 4, 5, 6, 9, 10, and 11 of the '948 Patent is found in Rational's SCC based on publicly available information taken from one or more sections (alone or in combination) of Rational's SCC manual, parts list, and website. TLC will supplement Exhibit A after fact and expert discovery.

Interrogatory No. 2.

Describe (by way of claim chart) TLC's construction of the claims of the patent in suit, as follows: For each claim of the '948 patent that TLC contends any Rational product has infringed or is infringing either literally or under the doctrine of equivalents, state TLC's interpretation of each claim limitation, identify all evidence intrinsic to the '948 patent that supports TLC's interpretation, and identify all evidence extrinsic to the '948 patent that either supports or refutes TLC's interpretation. For each claim term, phrase, and element that TLC asserts should be assigned its ordinary meaning, state that meaning, specify all bases for TLC's assertion, identify all supporting evidence, and identify three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 2

TLC objects to this interrogatory as vague and ambiguous, including but not limited to the phrase "refutes" as used in the context of this interrogatory. Furthermore, TLC objects to this interrogatory insofar as the Court has not yet construed the claims of the '948 Patent. TLC objects to this interrogatory on the grounds that it is premature because discovery in this matter is just beginning, and Rational has not yet produced any documents to TLC. TLC reserves the right to modify or supplement its responses as TLC locates additional information, or based on a ruling from the Court.

Subject to the foregoing, and the General Objections, TLC responds as follows:

Claim construction is a question of law for the Court to decide. As discovery is in its nascent stages, this interrogatory is premature. Additionally, TLC refers Rational to its response to Interrogatory number 1.

Interrogatory No. 3.

For each claim in the patent in suit, specify the dates on which the claimed subject matter was (i) conceived, (ii) reduced to practice, (iii) first described in a document, and (iv) first disclosed to a person other than the inventors. Identify all supporting documents, samples, investigations, tests, measurements, analyses, opinions, testimony for each date, and three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 3

TLC objects to this interrogatory on the grounds that it calls for a legal conclusion. TLC further objects to this interrogatory as premature in that TLC has not yet identified the complete set of claims to be asserted in this matter. TLC objects to this interrogatory as seeking information regarding claims of the '948 Patent that are not asserted in this matter, as such information is not relevant to any claim or defense in this matter. Furthermore, TLC objects to this interrogatory insofar as the Court has not yet construed the claims of the '948 Patent. TLC objects to this interrogatory on the grounds that it is premature because discovery in this matter is just beginning, and Rational has not yet produced any documents to TLC. TLC reserves the right to modify or supplement its responses as TLC locates additional information or based on a ruling by the Court.

Subject to the foregoing, and the General Objections, TLC responds as follows:

The inventions described and claimed in the '948 Patent were conceived at least as early as March 16, 1987, and reduced to practice at least as early as September 1, 1987. The inventions were reduced to practice in the course of developing an advanced digital programmable oven controller. By about September 1, 1987, FAST had constructed and successfully tested a digital programmable oven controller embodying one or more claims of the '948 Patent in the context of providing a confidential disclosure to Kentucky Fried Chicken to allow them to evaluate and assess the device. The two people most knowledgeable concerning the content of this response are Bernard G. Koether and Mario Pasquini.

Interrogatory No. 4.

Describe the technical area(s) to which the patent in suit pertains including, but not limited to, a description of the level of schooling, experience, expertise, and relevant technical skill that a person having ordinary skill in the art would have had at the time the claimed invention was made. Identify three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 4

TLC objects to this interrogatory to the extent it calls for a legal conclusion. Furthermore, TLC objects to this interrogatory insofar as the Court has not yet construed the claims of the '948 Patent. TLC objects to this interrogatory on the grounds that it is premature because discovery in this matter is just beginning, and Rational has not yet produced any documents to TLC. TLC reserves the right to modify or supplement its responses as TLC locates additional information, or based on a ruling from the Court

Subject to the foregoing, and the General Objections, TLC responds as follows:

The inventors of the '948 Patent were persons of ordinary skill in the art at the time the invention was made. As this litigation progresses, Rational will have the opportunity to depose one or both of the inventors to determine his level of skill.

Interrogatory No. 5.

Describe the actions that TLC and FAST took, before filing the Complaint dated August 31, 2006, to analyze Rational's products or investigate whether any Rational products infringe the '948 patent including, but not limited to, identifying what machines were analyzed, the model numbers of the analyzed machines, where, when and how long the machines were analyzed, any documents, reports, photographs, summaries or notes concerning the analysis, each person who participated in or assisted with any such analysis or investigation, and all facts supporting TLC and FAST's allegations in paragraphs 8, 13, 14 and 15 of the Complaint dated August 31, 2006. Identify three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 5

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects to this interrogatory to the extent it calls for information that is protected from discovery under the attorney-client privilege, work product doctrine, or any other applicable privilege or protection.

Interrogatory No. 6.

Describe any communication between TLC and any third party concerning this lawsuit or Rational's alleged infringing activity including, but not limited to, communications with FAST, TurboChef Technologies, Inc., United Electric Controls Co., Henny Penny Corporation, The Middleby Corporation, Barbecue King Industries, or any other. Identify three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 6

TLC reserves the right to modify or supplement its responses as TLC locates additional information, or based on a ruling from the Court.

Subject to the foregoing, and the General Objections, TLC responds as follows:

TLC will produce non-privileged documents sufficient to respond to this interrogatory pursuant to Fed. R. Civ. P. 33 (d).

Interrogatory No. 7.

Describe any rights granted by TLC to any third party including, but not limited to, FAST, TurboChef Technologies, Inc. or United Electric Controls Co., concerning the '948 patent. Describe the rights granted by or through any license, settlement agreement, or any other agreement including, but not limited to, all terms, geographic limitations, price restrictions, duration, implementation, parties, consideration, and consideration actually paid or exchanged. Identify all documents reflecting rights granted and three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 7

TLC objects to this interrogatory to the extent it requests information protected by confidentiality agreements with third parties, under which agreements TLC is prohibited from disclosing terms regarding the '948 Patent. TLC reserves the right to modify or supplement its responses as TLC locates additional information, or based on a ruling from the Court.

Subject to the foregoing, and the General Objections, TLC responds as follows:

TLC will produce non-privileged documents sufficient to respond to this interrogatory pursuant to Fed. R. Civ. P. 33 (d). The person most knowledgeable concerning the content of this response is Bernard G. Koether

Interrogatory No. 8.

Identify all validity, infringement, freedom-to-operate, or prior art searches or investigations that have ever been conducted by or on behalf of TLC relating to the '948 patent including, but not limited to, who conducted the search or investigation, when it occurred, an identification of what was discovered in such search(es) or investigation(s), who received that information, when the search(es) were done, and any documents memorializing the search or investigation, conclusion, findings or documents relating thereto. Identify three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 8

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects to this interrogatory to the extent it calls for information that is protected from discovery under the attorney-client privilege, work product doctrine, or any other applicable privilege or protection. Additionally, TLC objects to this interrogatory as vague and ambiguous, including but not limited to the phrase "freedom-to-operate" as used in the context of this interrogatory. TLC reserves the right to modify or supplement its responses as TLC locates additional information, or based on a ruling from the Court.

Interrogatory No. 9.

Describe what TLC contends is the proper measure of damages for Rational's alleged infringement of the patent in suit. To the extent TLC contends it is entitled to a royalty, state whether TLC contends it is entitled to a reasonable royalty or an established royalty. State the basis for determining the royalty including, but not limited to, all factors (positive and negative) and calculations used to arrive at the royalty. Identify three individuals most knowledgeable about the information requested in this interrogatory.

Response to Interrogatory No. 9

TLC objects to this interrogatory to the extent it calls for a legal conclusion. Additionally, TLC objects to this interrogatory as vague and ambiguous, including but not limited to the phrase "established royalty" as used in the context of this interrogatory. Furthermore, TLC objects to this interrogatory insofar as the Court has not yet construed the claims of the '948 Patent. TLC objects to this interrogatory on the grounds that it is premature

because discovery in this matter is just beginning, and Rational has not yet produced any documents to TLC. TLC reserves the right to modify or supplement its responses as TLC locates additional information, or based on a ruling from the Court.

Subject to the foregoing, and the General Objections, TLC responds as follows:

As discovery is in its nascent stages, this interrogatory is premature. TLC will supplement its response to this interrogatory as discovery progresses.

Interrogatory No. 10.

Identify each person that TLC may call as a fact or expert witness at trial. For each such person, specify the subject matter about which the witness will offer testimony and identify all documents they will rely upon

Response to Interrogatory No. 10

Subject to the General Objections, TLC responds as follows:

As discovery is in its nascent stages, this interrogatory is premature. TLC refers Rational to its 26(a) disclosures served in this case on December 22, 2006.

Interrogatory No. 11.

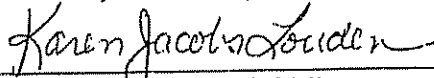
Identify each person who prepared or aided in preparing answers to the interrogatories for TLC, state that person's role in answering the interrogatories, and include for each such person an identification of which interrogatories that person prepared or aided in preparing for TLC, as well as, all documents reviewed or relied upon to support TLC's responses

Response to Interrogatory No. 11

In addition to the General Objections, TLC objects to this interrogatory as vague and ambiguous, including but not limited to the phrase "aided in preparing" in the context of this interrogatory

AS to objections:

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January 16, 2007

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EXHIBIT A

Exhibit A

U.S. Patent No. 4,920,948

Koether et al.

Claim Elements	Element found in Rational Literature
1. A parameter control system for controlling temperature and volumetric flow rate for an oven for heating a food product comprising:	
means for heating a heating medium in the oven;	<i>SCC Manual Page 29¹</i> : "Powerful heating elements heat the dry air. Cooking cabinet temperature can be set to between 30°C and 300°C."
first digitally programmed means,	<i>SCC Manual Page 36 and 38</i> : Pictures of controls on these pages depict numerous buttons to program the oven. <i>SCC Manual Page 62</i> . Provides information about locating the software identification, therefore, there must be software.
having temperature sensing means and	<i>SCC Manual Page 27</i> : Instructs that to "Request cooking data... Hold down temperature button (2 sec.)... The following values are displayed: ...current cooking cabinet temperature...current core temperature" <i>SCC Manual Page 20</i> : The pictures show the "core temperature probe" inserted into a muffin. <i>SCC Parts List – Page 70²</i> : "Thermocouple interior cabinet SCC line 61-202"
having product keys and,	<i>SCC Manual Page 18</i> : The pictures show the process for using the "SelfCooking Control Mode" using the example of "Veal roast." The process involves pressing keys corresponding to the desired preparation, and "that's it! The unit right away works with preset, factory-tested settings." Product keys include fish, meat, chicken, and

¹ "SCC Manual" refers to the Rational Manual for the SelfCooking Center®

² "SCC Parts List" refers to the Rational Spare Part –Price List, Valid from 1 1 2006

	<p>bread. Preparation keys include "Soft roasting", "Overnight Roasting", "Overnight Cooking."</p> <p><i>SCC Manual Page 39</i> Shows the "Test" button being pressed in step 4, therefore the cooking program that is programmed on page 38 is stored to a "soft key", and is activated by pressing the key.</p>
having a predetermined temperature control algorithm communicating with said temperature sensing means	<p><i>SCC Manual Page 20</i>: "If the core temperature probe is not inserted or incorrectly inserted. . .the buzzer sounds and you see an appropriate message on the display. . .The cooking process continues once the probe position has been corrected."</p> <p><i>See also SCC Manual Page 29</i>: depicting the use of the core temperature probe to control desired heat.</p> <p><i>Id</i> : "Note: During continuous operation the cooking cabinet temperature is automatically reduced from 300°C to 270°C after 60 minutes."</p> <p><i>SCC Manual Page 16</i>: "The 7 SelfCooking Control modes (large joints, pan fries, poultry, fish, bakery products, side dishes, Finishing) automatically detect product-specific requirements, the size of the food to be cooked and the load size. Cooking time temperature and the ideal cooking cabinet climate are continuously adjusted to achieve the result that you want."</p> <p><i>SCC Manual Page 33</i>: "The cooking process is regulated by a 6-point core temperature measurement in the food "</p> <p><i>SCC Parts List Page 79</i>: "Control pcb SCC line SCC 61-202, etc "</p> <p><i>SCC Manual Pages 18, 20, 22, 24</i>: After preheat temperature is reached, "Load" indication appears, cooking cycle can begin once the controller senses door open and close, indicating food has been loaded.</p>

	<p><i>SCC Manual Page 38</i>: depicts that the cooking cycle does not begin until the oven has been pre-heated</p> <p><i>SCC Manual Pages 18, 20, 22, 24</i> After preheat temperature is reached, "Load" indication appears, cooking cycle can begin once the controller senses door open and close, indicating food has been loaded.</p> <p><i>SCC Manual Page 38</i> depicts that the cooking cycle does not begin until the oven has been pre-heated.</p>
and having program parameter variables per product key programmable for temperature values $T_{sub.1}$, $T_{sub.2}$, ... $T_{sub.n}$ at time intervals $t_{sub.1}$, $t_{sub.2}$, ... $t_{sub.n}$, respectively, where n equals 1, 2 ... n to the number of intervals,	<p><i>SCC Manual Page 38 & 39</i>: The diagrams on page 38 and 39 of the SCC Manual indicate that the temperature may be programmed for each step, specifically:</p> <p>Pg. 38: Steps 6 and 7 correspond to the programming of "T" temperature; Steps 8 and 9 correspond to the programming of "t" time, and "n" the last interval is determined when the end button is pushed as shown in the first step 11. Furthermore, intervals may be programmed, which is shown in the second step 11: "For extra program steps see Section 6-9." (note: we assume that this is poorly translated, and should read: "for extra program steps repeat steps 6-9.")</p> <p>Pg. 39: Shows the "Test" button being pressed in step 4, therefore the cooking program that is programmed on page 38 is stored to a "soft key", and is activated by pressing the key.</p> <p><i>SCC Product Features</i>:³ "At least 350 programs with up to 12 steps freely selectable."</p>
and said digitally programmed means including closed loop heat control means controlled by said algorithm,	<p><i>SCC Manual Page 16</i>: "The 7 SelfCooking Control modes (large joints, pan fries, poultry, fish, bakery products, side dishes, Finishing) automatically detect product-specific</p>

³ "SCC Product Features" refers to the Features Section for the SelfCooking Center as found on the Rational Website under the "Technical data" section for the SelfCooking Center.

<p>for controlling as a first parameter the temperature of the heating medium;</p>	<p>requirements, the size of the food to be cooked and the load size. Cooking time temperature and the ideal cooking cabinet climate are continuously adjusted to achieve the result that you want.”</p> <p><i>SCC Manual Page 33:</i> “The cooking process is regulated by a 6-point core temperature measurement in the food.”</p> <p><i>SCC Manual Page 29:</i> “Powerful heating elements heat the dry air. Cooking cabinet temperature can be set to between 30°C and 300°C.”</p> <p><i>SCC Manual Page 51</i> Functions—Delta-T-cooking “By gradually raising the temperature in the cabinet until the cooking process ends and maintaining a constant differential to the current core temperature, the meat is cooked more slowly.”</p>
<p>second digitally programmed means, having a predetermined volumetric control algorithm</p>	<p><i>SCC Page 34:</i> Depicts the control of air speed through the use of buttons.</p> <p><i>SCC Parts List Page 79:</i> “Control pcb SCC line SCC 61-202, etc.”</p> <p><i>SCC Manual Page 38 & 39:</i> The diagrams on these pages show product keys with parameters for each mode. The parameters include temperature, time, fan, and humidity. Specifically: Pg. 38: “All option functions, e.g. fan wheel (excepting CleanJet, Descale and Cool Down), may be incorporated.)</p>
<p>having program parameter variables per product key programmable for volumetric flow rate values $V_{sub.1}$, $V_{sub.2}$. . . $V_{sub.n}$ at time intervals $t_{sub.1}$, $t_{sub.2}$. . . $t_{sub.n}$, respectively, where n equals 1, 2 . . . n to the number of intervals,</p>	<p><i>SCC Product Features:</i> “At least 350 programs with up to 12 steps freely selectable.” The diagrams on page 34, 38 & 39 of the SCC Manual indicate that the air speed may be programmed for each step, specifically: Pg. 38: “All option functions, e.g. fan wheel (excepting CleanJet, Descale and Cool Down), may be incorporated)” Steps 8 and 9 correspond to the programming of “t” time,</p>

	<p>and “n” the last interval is determined when the end button is pushed as shown in the first step 11. Furthermore, intervals may be programmed, which is shown in the second step 11: “For extra program steps see Section 6-9.” (note: we assume that this is poorly translated, and should read: “for extra program steps repeat steps 6-9.”)</p> <p>Pg. 39: Shows the “Test” button being pressed in step 4, therefore the cooking program that is programmed on page 38 is stored to a “soft key”, and is activated by pressing the key.</p>
for controlling as a second parameter the volumetric flow rate of the heating medium; and	<p><i>SCC Manual Page 34</i>: “5 air speeds are available. The appliance operates at a standard air speed factory setting ” The picture shows that the fan can operate at any one of the following air speeds: “turbo air speed”, “standard air speed”, “½ air speed”, “1/4 air speed”, and “fan wheel cycles at ¼ air speed”.</p>
said first digitally programmed means including digitally programmed means for controlling a plurality of time intervals for predetermined values of the temperature and for predetermined values of the volumetric flow rate, per product key, of the heating medium in the oven.	<p><i>SCC Manual Page 38</i>: The pictures show that temperature and Air Speed can be programmed for different pre-set values during each step of the cooking cycle. Specifically, intervals may be programmed, which is shown in the second step 11: “For extra program steps see Section 6-9.” (note: we assume that this is poorly translated, and should read: “for extra program steps repeat steps 6-9.”)</p> <p><i>SCC Product Features</i>: “At least 350 programs with up to 12 steps freely selectable.”</p>

2. A system in accordance with claim 1 which	
includes programmed means for controlling as a third parameter the humidity of the heating medium	<p>Programming humidity can be best understood by reference to <i>SCC Pages 38 and 29-30</i>. Specifically,</p> <p>Page 38 shows the steps for setting temperature if "moist" is selected in step 5 (which sets the humidity to default 100%). However, if dry air is selected in step 5, the displays switch to those shown on page 29 for the succeeding steps. Likewise, if both dry heat and moist heat are selected in step 5, the display switches to those shown on page 30 for the succeeding program steps.</p> <p><i>SCC Manual Page 62</i> Provides information about locating the software identification, therefore, there must be software.</p>

<p>and in which said means for controlling one or more time intervals includes programmed means for controlling one or more time intervals</p> <p>for a predetermined value of the humidity of the heating medium in the oven.</p>	<p><i>SCC Manual Page 38:</i> The pictures show that temperature, humidity, and air Speed can be programmed for different pre-set values during each step of the cooking cycle.</p> <p>Programming humidity can be best understood by reference to <i>SCC Pages 38 and 29-30</i>. Specifically, Page 38 shows the steps for setting temperature if "moist" is selected in step 5 (which sets the humidity to default 100%). However, if dry air is selected in step 5, the displays switch to those shown on page 29 for the succeeding steps. Likewise, if both dry heat and moist heat are selected in step 5, the display switches to those shown on page 30 for the succeeding program steps.</p> <p><i>SCC Manual Page 31:</i> "ClimaPlus Control measures and regulates the humidity in the cooking cabinet to within one percent. You can set the exact product-specific climate for each food in the clima window."</p> <p><i>SCC Manual Page 27</i> "The following values are displayed: current cooking cabinet humidity."</p> <p><i>SCC Product Features:</i> "At least 350 programs with up to 12 steps freely selectable."</p>
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<p>3. A system in accordance with claim 1 in which a product key selects the programmed values of each of said parameters at predetermined time intervals.</p>	<p><i>SCC Manual Page 38 & 39:</i> The diagrams on page 38 and 39 of the SCC Manual indicate that the temperature and air speed may be programmed for each step, specifically:</p> <p>Pg. 38: Steps 6 and 7 correspond to the programming of "T" temperature; Steps 8 and 9 correspond to the programming of "t" time, and "n" the last interval is determined when the end button is pushed as shown in the first step 11. Furthermore, intervals may be programmed, which is shown in the second step 11: "For extra program steps see Section 6-9." (note: we assume that this is poorly translated, and should read: "for extra program steps repeat steps 6-9.")</p> <p>Pg. 38: "All option functions, e.g. fan wheel (excepting CleanJet, Descale and Cool Down), may be incorporated.)" Steps 8 and 9 correspond to the programming of "t" time, and "n" the last interval is determined when the end button is pushed as shown in the first step 11. Furthermore, intervals may be programmed, which is shown in the second step 11: "For extra program steps see Section 6-9." (note: we assume that this is poorly translated, and should read: "for extra program steps repeat steps 6-9 ")</p> <p>Pg. 39: Shows the "Test" button being pressed in step 4, therefore the cooking program that is programmed on page 38 is stored to a "soft key", and is activated by pressing the key.</p> <p><i>SCC Product Features:</i> "At least 350 programs with up to 12 steps freely selectable."</p>
<p>4. A system in accordance with claim 2 in which a product key selects the programmed values of each of said parameters at predetermined time intervals.</p>	<p>In addition to the air speed and temperature, humidity can be programmed</p> <p>Programming humidity can be best understood by reference to <i>SCC Pages 38 and 29-30</i></p> <p>Specifically,</p> <p>Page 38 shows the steps for setting temperature if "moist" is selected in step 5 (which sets the humidity to default 100%)</p> <p>However, if dry air is selected in step 5, the</p>

	<p>displays switch to those shown on page 29 for the succeeding steps. Likewise, if both dry heat and moist heat are selected in step 5, the display switches to those shown on page 30 for the succeeding program steps.</p> <p><i>SCC Product Features:</i> "At least 350 programs with up to 12 steps freely selectable."</p>
<p>5. A system in accordance with claim 3 in which any of said time intervals is dependent on the measured value of at least one of said parameters.</p>	<p><i>SCC Manual Page 16:</i> "The 7 SelfCooking Control modes (large joints, pan fries, poultry, fish, bakery products, side dishes, Finishing) automatically detect product-specific requirements, the size of the food to be cooked and the load size. Cooking time temperature and the ideal cooking cabinet climate are continuously adjusted to achieve the result that you want."</p> <p><i>SCC Manual Page 33:</i> "The cooking process is regulated by a 6-point core temperature measurement in the food "</p> <p><i>SCC Manual Page 51</i> Functions—Delta-T-cooking "By gradually raising the temperature in the cabinet until the cooking process ends and maintaining a constant differential to the current core temperature, the meat is cooked more slowly."</p>
<p>6. A system in accordance with claim 4 in which any of said time intervals is dependent on the measured value of at least one of said parameters</p>	<p><i>SCC Manual Page 16:</i> "The 7 SelfCooking Control modes (large joints, pan fries, poultry, fish, bakery products, side dishes, Finishing) automatically detect product-specific requirements, the size of the food to be cooked and the load size. Cooking time temperature and the ideal cooking cabinet climate are continuously adjusted to achieve the result that you want."</p> <p><i>SCC Manual Page 33:</i> "The cooking process is regulated by a 6-point core temperature measurement in the food."</p> <p><i>SCC Manual Page 51.</i></p>

	<p>Functions—Delta-T-cooking</p> <p>“By gradually raising the temperature in the cabinet until the cooking process ends and maintaining a constant differential to the current core temperature, the meat is cooked more slowly.”</p>
<p>9. A system in accordance with claim 1 in which said means for controlling said volumetric flow rate comprises a fan and at least one of means for adjusting the rotary speed of said fan, means for adjusting the location of the fan and means for adjusting an aperture for the flow of the heating medium.</p>	<p><i>SCC Manual Page 34</i>: “5 air speeds are available. The appliance operates at a standard air speed factory setting.” The picture shows that the fan can operate at any one of the following air speeds: “turbo air speed”, “standard air speed”, “½ air speed”, “1/4 air speed”, and “fan wheel cycles at ¼ air speed”.</p>
<p>10. A system in accordance with claim 2 in which said means for controlling said volumetric flow rate comprises a fan and at least one of means for adjusting the rotary speed of the fan and means for adjusting an aperture for the flow of the heating medium.</p>	<p><i>SCC Manual Page 34</i>: “5 air speeds are available. The appliance operates at a standard air speed factory setting.” The picture shows that the fan can operate at any one of the following air speeds: “turbo air speed”, “standard air speed”, “½ air speed”, “1/4 air speed”, and “fan wheel cycles at ¼ air speed”.</p>

11. A parameter control system for controlling temperature and humidity for an oven for heating a food product comprising:	
means for heating a heating medium in the oven;	<i>SCC Manual Page 29:</i> "Powerful heating elements heat the dry air. Cooking cabinet temperature can be set to between 30°C and 300°C."
first digitally programmed means,	<i>SCC Manual Page 36:</i> Picture of controls on this page depicts numerous buttons to program the oven. <i>SCC Manual Page 62</i> Provides information about locating the software identification, therefore, there must be software.
having temperature sensing means	<i>SCC Manual Page 27:</i> Instructs that to "Request cooking data... Hold down temperature button (2 sec.)... The following values are displayed: ...current cooking cabinet temperature... current core temperature" <i>SCC Manual Page 20:</i> The pictures show the "core temperature probe" inserted into a muffin. <i>SCC Parts List – Page 70:</i> "Thermocouple interior cabinet SCC line 61-202"
and having product keys and,	<i>SCC Manual Page 18:</i> The pictures show the process for using the "SelfCooking Control Mode" using the example of "Veal roast." The process involves pressing keys corresponding to the desired preparation, and "that's it! The unit right away works with preset, factory-tested settings." Product keys include fish, meat, chicken, and bread. Preparation keys include "Soft roasting", "Overnight Roasting", "Overnight Cooking."
having a predetermined temperature control algorithm communicating with said temperature sensing means	<i>SCC Manual Page 20:</i> "If the core temperature probe is not inserted or incorrectly inserted . the buzzer sounds and you see an appropriate message on the display The cooking process continues once the probe position has been corrected."

	<p><i>See also SCC Page 29:</i> depicting the use of the core temperature probe to control desired heat. <i>Id.</i> : “Note: During continuous operation the cooking cabinet temperature is automatically reduced from 300°C to 270°C after 60 minutes.”</p> <p><i>SCC Manual Page 16:</i> “The 7 SelfCooking Control modes (large joints, pan fries, poultry, fish, bakery products, side dishes, Finishing) automatically detect product-specific requirements, the size of the food to be cooked and the load size. Cooking time temperature and the ideal cooking cabinet climate are continuously adjusted to achieve the result that you want.”</p> <p><i>SCC Manual Page 33:</i> “The cooking process is regulated by a 6-point core temperature measurement in the food.”</p> <p><i>SCC Parts List Page 79:</i> “Control pcb SCC line SCC 61-202, etc ”</p> <p><i>SCC Manual Pages 18, 20, 22, 24:</i> After preheat temperature is reached, “Load” indication appears, cooking cycle can begin once the controller senses door open and close, indicating food has been loaded.</p> <p><i>SCC Manual Page 38:</i> depicts that the cooking cycle does not begin until the oven has been pre-heated.</p> <p><i>SCC Manual Pages 18, 20, 22, 24:</i> After preheat temperature is reached, “Load” indication appears, cooking cycle can begin once the controller senses door open and close, indicating food has been loaded.</p> <p><i>SCC Manual Page 38</i> depicts that the cooking cycle does not begin until the oven has been pre-heated.</p>
and having program parameter variables per product key programmable for temperature	<i>SCC Manual Page 38 & 39:</i> The diagrams on page 38 and 39 of the SCC Manual indicate

<p>values $T_{\text{sub.1}}$, $T_{\text{sub.2}}$, ..., $T_{\text{sub.n}}$ at time intervals $t_{\text{sub.1}}$, $t_{\text{sub.2}}$, ..., $t_{\text{sub.n}}$, respectively, where n equals 1, 2, ..., n to the number of intervals,</p>	<p>that the temperature may be programmed for each step, specifically:</p> <p>Pg. 38: Steps 6 and 7 correspond to the programming of "T" temperature; Steps 8 and 9 correspond to the programming of "t" time, and "n" the last interval is determined when the end button is pushed as shown in the first step 11. Furthermore, intervals may be programmed, which is shown in the second step 11: "For extra program steps see Section 6-9." (note: we assume that this is poorly translated, and should read: "for extra program steps repeat steps 6-9.")</p> <p>Pg. 39: Shows the "Test" button being pressed in step 4, therefore the cooking program that is programmed on page 38 is stored to a "soft key", and is activated by pressing the key</p> <p><i>SCC Product Features:</i> "At least 350 programs with up to 12 steps freely selectable."</p>
<p>and said digitally programmed means including closed loop heat control means</p> <p>responsive to said algorithm, for controlling as a first parameter the temperature of the heating medium;</p>	<p><i>SCC Manual Page 16:</i> "The 7 SelfCooking Control modes (large joints, pan fries, poultry, fish, bakery products, side dishes, Finishing) automatically detect product-specific requirements, the size of the food to be cooked and the load size. Cooking time temperature and the ideal cooking cabinet climate are continuously adjusted to achieve the result that you want."</p> <p><i>SCC Manual Page 33:</i> "The cooking process is regulated by a 6-point core temperature measurement in the food."</p> <p><i>SCC Manual Page 29:</i> "Powerful heating elements heat the dry air. Cooking cabinet temperature can be set to between 30°C and 300°C."</p> <p><i>SCC Manual Page 51</i> Functions—Delta-T-cooking "By gradually raising the temperature in the cabinet until the cooking process ends and maintaining a constant differential to the current core temperature, the meat is cooked</p>

<p>second digitally programmed means, having a predetermined humidity algorithm</p>	<p>more slowly.”</p> <p>Programming humidity can be best understood by reference to <i>SCC Pages 38 and 29-30</i> Specifically, Page 38 shows the steps for setting temperature if “moist” is selected in step 5 (which sets the humidity to default 100%). However, if dry air is selected in step 5, the displays switch to those shown on page 29 for the succeeding steps. Likewise, if both dry heat and moist heat are selected in step 5, the display switches to those shown on page 30 for the succeeding program steps.</p> <p><i>SCC Manual Page 62</i> Provides information about locating the software identification, therefore, there must be software.</p>
<p>having program parameter variables per product key programmable for humidity values $H_{sub.1}$, $H_{sub.2}$. . . $H_{sub.n}$ at time intervals $t_{sub.1}$, $t_{sub.2}$. . . $t_{sub.n}$, respectively, where n equals 1, 2 . . . n to the number of intervals,</p>	<p><i>SCC Manual Page 38:</i> The pictures show that temperature, humidity, and air Speed can be programmed for different pre-set values during each step of the cooking cycle.</p> <p>Programming humidity can be best understood by reference to <i>SCC Pages 38 and 29-30</i> Specifically, Page 38 shows the steps for setting temperature if “moist” is selected in step 5 (which sets the humidity to default 100%). However, if dry air is selected in step 5, the displays switch to those shown on page 29 for the succeeding steps. Likewise, if both dry heat and moist heat are selected in step 5, the display switches to those shown on page 30 for the succeeding program steps.</p> <p><i>SCC Manual Page 31:</i> “ClimaPlus Control measures and regulates the humidity in the cooking cabinet to within one percent. You can set the exact product-specific climate for each food in the clima window.”</p> <p><i>SCC Manual Page 27</i> “The following values are displayed: current cooking cabinet humidity.”</p>

	<p><i>SCC Product Features:</i> "At least 350 programs with up to 12 steps freely selectable."</p>
<p>including closed loop humidity control means and humidity monitoring means,</p> <p>for controlling as a second parameter the humidity of the heating medium; and</p>	<p><i>SCC Manual Page 31:</i> "ClimaPlus Control measures and regulates the humidity in the cooking cabinet to within one percent. You can set the exact product-specific climate for each food in the clima window."</p> <p><i>SCC Manual Page 27</i> "The following values are displayed: current cooking cabinet humidity."</p>
<p>said first digitally programmed means including digitally programmed means for controlling a plurality of time intervals for predetermined values of the temperature and predetermined values of the humidity, per product key, of the heating medium in the oven.</p>	<p>Temperature and Humidity are controlled at the programmed values during each step of the cooking cycle. (<i>SCC Manual Page 31 & 39</i>)</p> <p><i>SCC Manual Page 38 & 39:</i> The diagrams on page 38 and 39 of the SCC Manual indicate that the temperature may be programmed for each step, specifically:</p> <p>Pg. 38: Steps 6 and 7 correspond to the programming of "T" temperature; Steps 8 and 9 correspond to the programming of "t" time, and "n" the last interval is determined when the end button is pushed as shown in the first step 11. Furthermore, intervals may be programmed, which is shown in the second step 11: "For extra program steps see Section 6-9." (note: we assume that this is poorly translated, and should read: "for extra program steps repeat steps 6-9.")</p> <p>Programming humidity can be best understood by reference to <i>SCC Pages 38 and 29-30</i> Specifically:</p> <p>Page 38 shows the steps for setting temperature if "moist" is selected in step 5 (which sets the humidity to default 100%). However, if dry air is selected in step 5, the displays switch to those shown on page 29 for the succeeding steps. Likewise, if both dry heat and moist heat are selected in step 5, the display switches to those shown on page 30 for the succeeding program steps.</p> <p>Pg. 39: Shows the "Test" button being</p>

	pressed in step 4, therefore the cooking program that is programmed on page 38 is stored to a "soft key", and is activated by pressing the key.
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CERTIFICATE OF SERVICE

I, the undersigned, hereby certify that copies were caused to be served on
January 16, 2007 upon the following in the manner indicated:

By Hand

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EXHIBIT AA

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TECHNOLOGY LICENSING CORPORATION,)	
a Florida corporation,)	
)	
Plaintiff,)	C.A. No. 06-515 (JJF)
)	
v.)	
)	
RATIONAL COOKING SYSTEMS, INC., a)	
Delaware corporation,)	
)	
Defendant.)	

**TLC'S OBJECTIONS AND RESPONSES TO DEFENDANT'S FIRST SET OF
REQUESTS FOR THE PRODUCTION OF DOCUMENTS AND THINGS (NOS. 1-132)**

Pursuant to Rules 26 and 34 of the Federal Rules of Civil Procedure and the Local Civil Rules, Technology Licensing Corporation ("TLC") hereby responds to Rational Cooking Systems, Inc.'s ("Rational's") First Set of Requests for Production to TLC. As discovery is ongoing, TLC's responses may be modified and/or supplemented as additional information becomes known to TLC. TLC's Preliminary Statement and General Objections to Rational First Set of Interrogatories Nos. 1-11 are incorporated herein by reference.

RESPONSE TO REQUESTS

Request No. 1.

Each document or thing concerning a conception of any alleged invention claimed in U.S. Patent No. 4,920,948 ("the '948 patent")

Response to Request No. 1

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 2.

Each document or thing concerning an initial disclosure of any alleged invention claimed in the '948 patent.

Response to Request No. 2

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 3.

Each document or thing concerning a reduction to practice of any alleged invention claimed in the '948 patent.

Response to Request No. 3

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 4.

Each document or thing concerning the research, development, or testing of any alleged invention claimed in the '948 patent.

Response to Request No. 4

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 5.

Each document or thing concerning the first use, sale, or offer for sale of any alleged invention claimed in the '948 patent.

Response to Request No. 5

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 6.

Each document or thing concerning the first use of a control system that TLC contends embodies the subject matter claims in the '948 patent.

Response to Request No. 6

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 7.

Each document or thing concerning the novelty, patentability, validity, infringement, state-of-the-art, or right-to-use search or study that pertains to the '948 patent or to application serial number 07/114,563

Response to Request No. 7

In addition to the General Objections, TLC objects that this request is vague and ambiguous. For example, the term "state-of-the-art" is vague and ambiguous in the context of this request. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 8.

Each document or thing including, but not limited to, patents and publications, found or discovered as a result of a novelty, patentability, validity, infringement, state-of-the-art, or right-to-use search or study pertaining to the '948 patent or to application serial number 07/114,563

Response to Request No. 8

In addition to the General Objections, TLC objects that this request is vague and ambiguous. For example, the term "state-of-the-art" is vague and ambiguous in the context of this request. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 9.

Each document or thing concerning the sale, transfer, grant, conveyance, assignment, or license of any right under the '948 patent.

Response to Request No. 9

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 10.

Each document or thing concerning a license, release, covenant not to sue, or immunity from suit under the '948 patent.

Response to Request No. 10

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific

objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 11.

Each document or thing concerning an attempt by TLC to license the '948 patent.

Response to Request No. 11

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 12.

Each document or thing concerning a threat to sue or a charge of infringement under the '948 patent including, but not limited to, letters threatening suit or charging infringement and notes or memos concerning telephone conversations in which infringement was alleged.

Response to Request No. 12

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 13.

Each document or thing concerning the decision to sue Rational or any other person or organization for infringement of the '948 patent.

Response to Request No. 13

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific

objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 14.

Each document or thing concerning the decision not to sue a person or organization for infringement of the '948 patent.

Response to Request No. 14

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 15.

Each document or thing concerning a Rational product, brochure, manual, magazine, description, investigation, analysis, meeting, conference, correspondence, or telephone conversation regarding the decision to sue Rational.

Response to Request No. 15

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. TLC additionally objects that this request is vague and ambiguous. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 16.

Each document or thing concerning FAST's withdrawal from this lawsuit.

Response to Request No. 16

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: after conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 17.

With respect to the case *Food Automation-Service Techniques, Inc v United Electric Controls Co*, No. 95-12663 (D. Mass. filed Dec. 8, 1995), all documents concerning the litigation including, but not limited to, production documents, interrogatory answers, document production responses, all pleadings, all correspondence with the court, documents concerning the settlement and resolution of the case, and documents influencing, affecting, obligating or requiring TLC or FAST to sue Rational.

Response to Request No. 17

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous. For example, the phrase “influencing, affecting, obligating or requiring” is vague in the context of this document request. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 18.

With respect to the case *Technology Licensing Corp, et al v. Turbochef Tech, Inc.*, No. 05-01245 (D. Conn. Filed Aug. 8, 2005), all documents concerning the litigation including, but not limited to, production documents, interrogatory answers, document production responses, all pleadings, all correspondence with the court, documents concerning the settlement and resolution of the case, and documents influencing, affecting, obligating or requiring TLC or FAST to sue Rational.

Response to Request No. 18

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous. For example, the phrase “influencing, affecting, obligating or requiring” is vague in the context of this document request

Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 19.

Each document or thing from any meeting attended by TLC and FAST concerning the '948 patent.

Response to Request No. 19

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 20.

Each document or thing from any meeting attended by TLC or FAST concerning U.S. Patent No. 4,742,455 ("the '455 patent").

Response to Request No. 20

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 21.

Each document or thing from any meeting attended by TLC, FAST or Rational AG (including predecessors) concerning the '948 patent including, but not limited to, any meetings held in Germany in May 1998.

Response to Request No. 21

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 22.

Each document or thing from any meeting attended by TLC, FAST or Rational AG (including predecessors) concerning any possible future business relationship between any of the companies.

Response to Request No. 22

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 23.

Each document or thing concerning any communication with any third party concerning this lawsuit, Rational or the '948 patent including, but not limited to, communications with FAST, TurboChef Technologies, Inc., Henny Penny Corporation, The Middleby Corporation, Barbecue King Industries or other manufacturer, distributor or supplier.

Response to Request No. 23

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 24.

Each document or thing concerning the relationship between TLC and Micro-Technology Licensing Corporation.

Response to Request No. 24

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 25.

Each document or thing concerning any press release concerning this lawsuit

Response to Request No. 25

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 26.

Each document or thing concerning any press release concerning the '948 patent.

Response to Request No. 26

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 27.

Each document or thing concerning any press release concerning any lawsuit in which infringement of the '948 patent was alleged.

Response to Request No. 27

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 28.

Each document or thing concerning the relationship between TLC and FAST.

Response to Request No. 28

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 29.

Each document or thing concerning TLC's organizational structure.

Response to Request No. 29

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 30.

Each document or thing concerning the ownership of TLC including, but not limited to, identification of the owners and the percentage of the company owned by each owner.

Response to Request No. 30

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 31.

Each document or thing concerning any ownership interest by TLC of FAST including, but not limited to, identification of the owners and the percentage of the company owned by each owner.

Response to Request No. 31

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 32.

Each document or thing concerning Bernard G Koether's role at TLC since its formation to date

Response to Request No. 32

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 33.

Each document or thing concerning Bernard G. Koether's role as Chairman of TLC.

Response to Request No. 33

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 34.

Each document or thing concerning Bernard G. Koether's role as Chairman of FAST.

Response to Request No. 34

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. TLC additionally objects that this request is vague and ambiguous and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 35.

Each document or thing concerning Bernard G. Koether's present role at FAST.

Response to Request No. 35

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. TLC additionally objects that this request is vague and ambiguous and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 36.

Each document or thing concerning Mario Ceste's role at TLC.

Response to Request No. 36

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. TLC additionally objects that this request is vague and ambiguous and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 37.

Each document or thing concerning Mario Ceste's role at FAST.

Response to Request No. 37

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. TLC additionally objects that this request is vague and ambiguous and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does

not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 38.

Each document or thing concerning the '948 patent.

Response to Request No. 38

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 39.

Each document or thing concerning U.S. patent application serial no. 07/114,563.

Response to Request No. 39

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 40.

Each document or thing concerning the preparation or prosecution of U.S. patent application serial no. 07/114,563.

Response to Request No. 40

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 41.

Any drafts, working copies, or marked versions of any paper concerning the patent application that was filed with PTO on October 29, 1987, and assigned application serial no. 07/114,563 including, but not limited to, any draft of any portion of the specification or claims.

Response to Request No. 41

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 42.

Each document or thing concerning any prior art search concerning the '948 patent.

Response to Request No. 42

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 43.

Each document or thing concerning any prior art search concerning U.S. patent application serial no. 07/114,563.

Response to Request No. 43

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 44.

All drafts of any declarations or other documents submitted to the U.S. Patent and Trademark Office during the prosecution of U.S. patent application serial no. 07/114,563.

Response to Request No. 44

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 45.

Any patent, publication, or other prior art that was cited, referred to, or relied upon during the prosecution of U.S. patent application serial no. 07/114,563.

Response to Request No. 45

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 46.

Each document or thing concerning any pending or abandoned U.S. patent application related to or claiming priority to U.S. patent application serial no. 07/114,563 including, but not limited to, any divisional, continuation, or continuation-in-part application.

Response to Request No. 46

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 47.

Each document or thing concerning any pending foreign patent application or issued patent related to or claiming priority based on U.S. patent application serial no. 07/114,563

Response to Request No. 47

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 48.

Each document or thing reflecting Bernard G. Koether's and Mario Pasquini's knowledge as to their duty of candor and good faith pursuant to 37 C.F.R. § 1.56 during the prosecution of U.S. patent application serial no. 07/114,563.

Response to Request No. 48

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Additionally, TLC objects that this request is vague and ambiguous in that whether a document or thing reflects a person's knowledge of a particular subject is a matter on which reasonable minds could differ. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 49.

Each document or thing reflecting the knowledge of those involved in the prosecution of U.S. patent application serial no. 07/114,563 as to their duty of candor and good faith pursuant to 37 C.F.R. § 1.56.

Response to Request No. 49

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Additionally, TLC objects that this request is vague and ambiguous. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 50.

Each document or thing concerning any example or embodiment appearing in the '948 patent including, but not limited to, research notebooks, laboratory notebooks, and any documents relating to the preparation, testing, analysis, evaluation, performance, or use of any control system.

Response to Request No. 50

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 51.

Each document or thing concerning a foreign counterpart of U.S. patent application serial no. 07/114,563 including, but not limited to, office actions and references cited during such prosecution.

Response to Request No. 51

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 52.

Any patent, publication, or other prior art that was cited, referred to, or relied upon in any opposition, cancellation, nullity, or other adversarial proceeding involving any foreign counterpart of U.S. patent application serial no. 07/114,563 or any foreign patent based upon any such foreign application.

Response to Request No. 52

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific

objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 53.

Each document or thing concerning any opposition, nullity, infringement, or other inter-partes [sic] proceeding in the United States or any foreign country concerning the '948 patent or any foreign counterpart patent or application including, but not limited to, all pleadings, exhibits, affidavits, declarations, attachments, supporting data, discovery materials, trial testimony, and any decision by the respective tribunal.

Response to Request No. 53

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 54.

Each document or thing concerning any litigation or adversarial proceeding concerning the '948 patent or any foreign counterpart patent or application including, but not limited to, court or agency filings and orders.

Response to Request No. 54

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 55.

All transcripts and exhibits from each deposition or other sworn statement provided by a TLC employee, TLC witness, third party, or nonparty witness in connection with any litigation or adversarial proceeding concerning the '948 patent or any foreign counterpart patent or application.

Response to Request No. 55

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 56.

Each document or thing concerning a control system that embodies the subject matter claimed in the '948 patent.

Response to Request No. 56

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Additionally, TLC objects that this request is vague, ambiguous, and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 57.

Each document or thing concerning any of the allegations in paragraph 7 of the Amended Complaint.

Response to Request No. 57

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 58.

Each document or thing concerning any of the allegations in paragraphs 12-14 of the Amended Complaint.

Response to Request No. 58

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 59.

Each document or thing concerning any trade show that TLC or anyone on TLC's behalf attended including, but not limited to, the 85th National Restaurant Association Hotel-Motel Show in 2004, in which any product was shown, demonstrated or made public that TLC alleges embodies the subject matter claimed in the '948 patent.

Response to Request No. 59

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 60.

Each document or thing concerning the manufacture, marketing, or sale of any product that embodies the subject matter claimed in the '948 patent.

Response to Request No. 60

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Additionally, TLC objects that this request is vague, ambiguous, and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 61.

Each document or thing concerning any analysis, investigation, inspection, examination, measurement, or test of any control system that embodies the subject matter claimed in the '948 patent

Response to Request No. 61

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Additionally, TLC objects that this request is vague ambiguous in that whether a control system embodies the subject matter claimed in the '948 patent is a subject on which TLC and Rational are likely to differ. TLC further objects that this request is overbroad to the extent it seeks analyses, examinations, inspections, measurements or tests of a control system that are not pertinent to the issues in this litigation. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 62.

Each document or thing concerning any product that TLC has accused of infringing the '948 patent.

Response to Request No. 62

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 63.

Each document or thing concerning any analysis, investigation, inspection, examination, measurement, or test of any SelfCooking Center[®] machine.

Response to Request No. 63

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: after conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request

Request No. 64.

All documents concerning Rational.

Response to Request No. 64

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 65.

All documents concerning Rational AG and its predecessors.

Response to Request No. 65

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 66.

All documents concerning the SelfCooking Center[®] machine.

Response to Request No. 66

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 67.

Each document or thing concerning any product sent from TLC to Rational AG or its predecessors

Response to Request No. 67

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: after conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 68.

Each magazine or newsletter which TLC or its employees subscribed to that describe or depict oven products, the oven industry, TLC, FAST, Rational, TurboChef Technologies, Inc., Henny Penny Corporation, The Middleby Corporation, Barbecue King Industries or other oven manufacturer(s), distributor(s) or supplier(s).

Response to Request No. 68

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 69.

Each document or thing concerning any Rational product including, but not limited to, photographs, brochures, manuals, and service guides.

Response to Request No. 69

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 70.

Each document or thing showing when TLC first became aware of the SelfCooking Center[®] machine.

Response to Request No. 70

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Additionally, TLC objects that this request is vague and ambiguous. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 71.

Any patent, publication, or other document identified by any third party as prior art that questioned, challenged, or disputed the validity or the enforceability of the '948 patent or any foreign counterpart.

Response to Request No. 71

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 72.

Each document or thing concerning communications or agreements between TLC and any third party regarding the validity, infringement, or enforceability of the '948 patent.

Response to Request No. 72

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 73.

Each document or correspondence received by or sent to Bernard G. Koether concerning the '948 patent.

Response to Request No. 73

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 74.

Each document or correspondence received by or sent to Mario Pasquini concerning the '948 patent.

Response to Request No. 74

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 75.

Each document or correspondence received by or sent to Mario G Ceste concerning the '948 patent.

Response to Request No. 75

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 76.

Each document or thing concerning any communication with Bernard G. Koether, Mario Pasquini, or Mario G Ceste regarding the '948 patent, U.S. patent application serial number 07/114,563, or enforcement of the '948 patent.

Response to Request No. 76

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 77.

Each document or thing concerning any agreement between TLC and any third party including, but not limited to, FAST or the inventors regarding the '948 patent.

Response to Request No. 77

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 78.

Each document or thing concerning the payment of any maintenance fee for the '948 patent or any foreign equivalent.

Response to Request No. 78

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 79.

Each document concerning the decision to file, continue prosecution, maintenance of, or abandon corresponding continuation, continuation-in-part or divisional applications and any patents relying on the '948 patent or its priority date.

Response to Request No. 79

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 80.

Each document or thing concerning a license under or an assignment of the '948 patent to or from TLC, FAST, Bernard G. Koether, or Mario Pasquini.

Response to Request No. 80

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 81.

Each document or thing concerning the scope of any claim in the '948 patent.

Response to Request No. 81

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous. For example, the phrase "concerning the scope" is vague in the context of this document request. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 82.

Each document or thing concerning the meaning of any term or phrase in any claim in the '948 patent

Response to Request No. 82

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 83.

Each document or thing concerning the infringement or noninfringement of any claim in the '948 patent.

Response to Request No. 83

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous and that this request calls for a legal conclusion as to which documents concern infringement or noninfringement of any claim in the '948 patent. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 84.

Each document or thing concerning the validity or invalidity of any claim in the '948 patent.

Response to Request No. 84

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous and that this request calls for a legal conclusion as to which documents concern validity or invalidity of any claim in the '948 patent. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 85.

Each document or thing concerning the enforceability or unenforceability of any claim in the '948 patent.

Response to Request No. 85

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous and that this request calls for a legal conclusion as to which documents concern enforceability or unenforceability of any claim in the '948 patent. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 86.

Each document or thing concerning the best mode known to the inventors as of October 29, 1987, for practicing any alleged invention claimed in the '948 patent.

Response to Request No. 86

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous and that this request calls for a legal conclusion as to which documents concern the best mode of the invention claimed in the '948 patent. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 87.

Each document or thing concerning the level of ordinary skill in the art to which the '948 patent pertains including, but not limited to, patents and publications.

Response to Request No. 87

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 88.

Any document evidencing, bearing upon, or establishing the relevant technical field to which the '948 patent pertains including, but not limited to, patents and publications.

Response to Request No. 88

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 89.

Any documents concerning any license negotiation involving the '948 patent.

Response to Request No. 89

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 90.

Any document concerning any royalty paid under the '948 patent.

Response to Request No. 90

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 91.

Any document concerning a reasonable royalty for the '948 patent.

Response to Request No. 91

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous and that this request calls for a legal conclusion as to which documents concern reasonable royalty for the '948 patent. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 92.

Any document concerning the applicability or inapplicability of any of the fifteen factors set forth in *Georgia-Pacific Corp v United States Plywood Corp*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), for determining the amount of a reasonable royalty for the '948 patent

Response to Request No. 92

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous in that whether a document supports applicability of any of the Georgia-Pacific factors is a matter on which reasonable minds can differ. TLC further objects that this request calls for a legal conclusion as to applicability or inapplicability of any of the fifteen factors set forth in *Georgia-Pacific Corp v*

United States Plywood Corp , 318 F. Supp 1116, 1120 (S.D.N.Y. 1970), for determining the amount of a reasonable royalty for the '948 patent.

Request No. 93.

Any document concerning an established royalty for the '948 patent.

Response to Request No. 93

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is vague and ambiguous and that this request calls for a legal conclusion as to which documents concern established royalty for the '948 patent. Furthermore, the phrase "established royalty" is vague and ambiguous in the context of this request. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 94.

Each license or agreement concerning any patent alleged to be comparable to the '948 patent for purposes of determining the amount of a reasonable royalty.

Response to Request No. 94

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 95.

Each document or thing concerning a license agreement under which TLC received any rights under a patent including, but not limited to, any royalties and any other economic consideration supplied by TLC.

Response to Request No. 95

In addition to the General Objections, TLC objects that this request is vague, ambiguous, and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 96.

Each document or thing concerning a license or agreement under which TLC granted any rights under a patent including, but not limited to, any royalties and any other economic consideration received by TLC

Response to Request No. 96

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 97.

Each document or thing concerning TLC's business plan(s) for licensing its '948 patent.

Response to Request No. 97

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 98.

Each document or thing concerning any royalties received by TLC for any patent license including, but not limited to, any royalty reports or summaries of any royalty payments

Response to Request No. 98

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 99.

Each document or thing concerning any valuation or appraisal of the '948 patent.

Response to Request No. 99

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 100.

Each document or thing concerning TLC's records regarding any royalty payment received.

Response to Request No. 100

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Additionally, TLC objects that this request is vague, ambiguous, and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 101.

Each document or thing concerning TLC's records reflecting compensation other than royalties received concerning the '948 patent.

Response to Request No. 101

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 102.

Each document or thing concerning any patent marking, patent pending designation, or notice under 35 U.S.C. §287 for any product, service, method, or combination thereof that TLC contends embodies the subject matter claimed in the '948 patent.

Response to Request No. 102

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 103.

Each document or thing concerning TLC's practice, policy, or procedure for the retention of documents and/or classes or categories of documents including, but not limited to, email communications, spreadsheets, presentations, and word-processing materials.

Response to Request No. 103

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 104.

Each document and thing concerning any experts retained by TLC to testify in this case, as well as any reports (including draft reports) prepared by or for the expert, any documents provided to the expert and any documents provided to TLC or its attorneys by such expert

Response to Request No. 104

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 105.

Each document or thing from Bernard G. Koether's files concerning the '948 patent.

Response to Request No. 105

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 106.

Each document or thing from Mario Pasquini's files concerning the '948 patent.

Response to Request No. 106

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 107.

Each document or thing from William Schreyer's files concerning the '948 patent.

Response to Request No. 107

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 108.

Each document or thing from Mario G. Ceste's files concerning the '948 patent.

Response to Request No. 108

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 109.

Each document or thing from Bernard G. Koether's files concerning the '455 patent

Response to Request No. 109

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 110.

Each document or thing from Mario Pasquini's files concerning the '455 patent

Response to Request No. 110

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 111.

Each document or thing from William Schreyer's files concerning the '455 patent.

Response to Request No. 111

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 112.

Each document or thing from Mario G. Ceste's files concerning the '455 patent.

Response to Request No. 112

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 113.

Each document or thing concerning Rory Radding's participation in the preparation and maintenance of the '948 patent.

Response to Request No. 113

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 114.

Each document or thing concerning Rory Radding's participation in the preparation and maintenance of the '455 patent

Response to Request No. 114

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 115.

Each document or thing concerning Mario G. Ceste's participation in the preparation and maintenance of the '948 patent.

Response to Request No. 115

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 116.

Each document or thing concerning Mario G. Ceste's participation in the preparation and maintenance of the '455 patent.

Response to Request No. 116

Subject to, and without waiving, the foregoing general objections, TLC responds as follows: After conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 117.

Each document or thing concerning Hilmar Messerschmidt's relationship with TLC

Response to Request No. 117

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 118.

Each document or thing concerning any communication between any person at TLC and Hilmar Messerschmidt.

Response to Request No. 118

In addition to the General Objections, which are incorporated fully by reference herein, TLC objects that this request is overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 119.

Each document or thing concerning any communication between Bernard G. Koether and Hilmar Messerschmidt concerning the '948 patent.

Response to Request No. 119

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 120.

Each document or thing concerning Hilmar Messerschmidt's invoices for time and services concerning the '948 patent and related meetings and discussions.

Response to Request No. 120

Subject to, and without waiving, the foregoing general objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 121.

Each document or thing concerning Hilmar Messerschmidt's invoices for time and services concerning the '455 patent and related meetings and discussions

Response to Request No. 121

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 122.

Each document or thing concerning Brett A. Valiquet's letter to Bernard Koether dated August 24, 1998 concerning the '948 patent.

Response to Request No. 122

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 123.

Each document or thing concerning Brett A. Valiquet's letter to Rory Radding dated October 12, 1998 concerning the '948 patent

Response to Request No. 123

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 124.

Each document or thing concerning Mario G. Ceste's relationship with TLC.

Response to Request No. 124

In addition to the General Objections, TLC objects that this request is vague, ambiguous, and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 125.

Each document or thing concerning Mario G. Ceste's relationship with FAST.

Response to Request No. 125

In addition to the General Objections, TLC objects that this request is vague, ambiguous, and overbroad. Subject to, and without waiving, the foregoing general and specific objections, TLC responds as follows: after conducting a reasonable search, it was determined that TLC does not have in its possession, custody or control any non-privileged documents responsive to this request.

Request No. 126.

Each document or thing concerning any communication with Rational regarding the '948 patent.

Response to Request No. 126

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 127.

Each document or thing concerning any communication with Rational AG or its predecessors regarding the '948 patent.

Response to Request No. 127

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 128.

Each document or thing concerning the '455 patent.

Response to Request No. 128

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 129.

Each document or thing concerning the preparation or prosecution of U S. patent application serial no. 06/840,362.

Response to Request No. 129

In addition to the General Objections, TLC objects that this request is duplicative of numerous other requests. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

Request No. 130.

Each document or thing identified in any of TLC's responses to Rational's First Set of Interrogatories Nos. 1 – 11.

Response to Request No. 130

In addition to the General Objections, which are incorporated fully by reference herein, TLC also incorporates herein by reference its General and Specific Objections to each and every interrogatory from Rational's First Set of Interrogatories. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search

Request No. 131.

Each document or thing relied upon by TLC in responding to Rational's First Set of Interrogatories Nos. 1 – 11.

Response to Request No. 131

In addition to the General Objections, which are incorporated fully by reference herein, TLC also incorporates herein by reference its General and Specific Objections to each and every interrogatory from Rational's First Set of Interrogatories. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

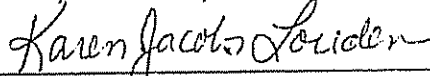
Request No. 132.

Each document or thing the identification of which is requested in Rational's First Set of Interrogatories Nos. 1 – 11.

Response to Request No. 132

In addition to the General Objections, which are incorporated fully by reference herein, TLC also incorporates herein by reference its General and Specific Objections to each and every interrogatory from Rational's First Set of Interrogatories. Subject to, and without waiving, the foregoing general and specific objections, TLC will produce all responsive, non-privileged documents within its possession, custody, or control that can be located after a reasonably diligent search.

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January 16, 2007

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CERTIFICATE OF SERVICE

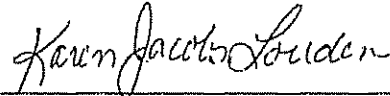
I, the undersigned, hereby certify that copies were caused to be served on
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